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Annual Report

Columbus Horticultural Society,
Columbus, Ohio

T. F. Hunt.

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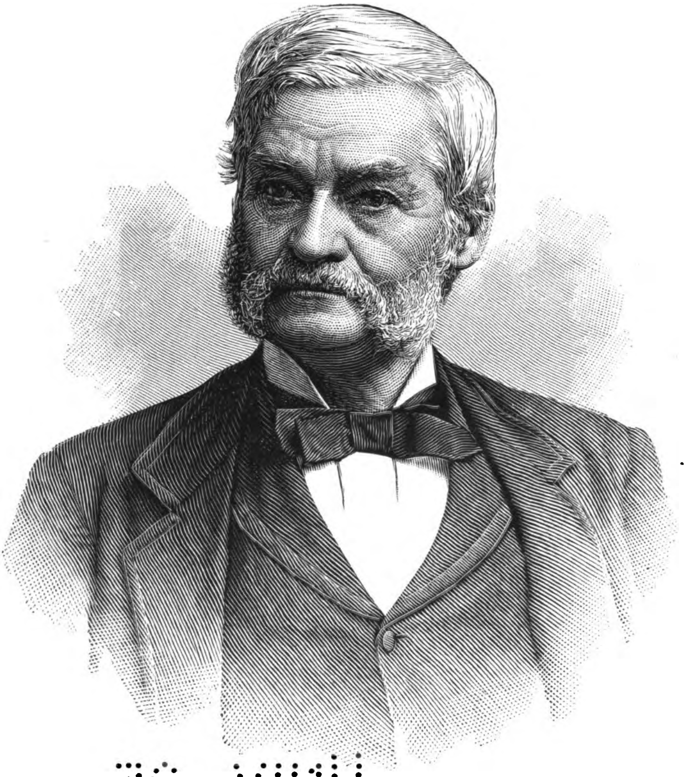

HORACE WILSON.

UNIV. OF CALIFORNIA

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ANNUAL REPORT

OF THE

COLUMBUS Horticultural Society

FOR THE YEAR ENDING DECEMBER 31, 1892.

CONTAINING

HISTORY OF THE SOCIETY, ARTICLES OF INCORPORATION, CONSTITUTION, LISTS OF MEMBERS,

AND

QUARTERLY JOURNAL.

Prepared by AUG. D. SELBY, Secretary.

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COLUMBUS, OHIO.
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COLUMBUS HORTICULTURAL SOCIETY.

HISTORICAL STATEMENT.

The COLUMBUS HORTICULTURAL SOCIETY was organized in 1845. The first meeting of citizens, to form the Society, was held on the 10th of April, in that year. At this meeting, the late Bela Latham was chosen chairman, and M. B. Bateham, Secretary; and a committee was appointed to report a constitution and by-laws. This committee consisted of Messrs. M. B. Bateham, Joseph Sullivant, Samuel Medary, John Burr, Alex. E. Glenn, Joseph Ridgway, Jr., and Joel Buttles.

The next meeting was held May 12th, at which a constitution was adopted, and the Society organized by electing Bela Latham, President; William S. Sullivant and Samuel Medary, Vice Presidents; Joseph Sullivant, Recording Secretary; M. B. Bateham, Corresponding Secretary; John W. Andrews, Treasurer; Dr. I. G. Jones, John Burr, John A. Lazell, John Fisher, Moses Jewett, John Miller and Leander Ransom, Managers.

On the 26th of September, 1845, the first public exhibition or fair of the Society was held, at which there was a fine display of fruits and flowers, and which was well attended by the citizens.

At the annual meeting in March, 1846, Mr. Latham was re-elected President. The annual fair was held on the 3d and 4th of September, at which there was a very large display of fruits and flowers, and a number of premiums awarded. This fair gave much interest to the Society, and induced many to become members.

In 1847, Mr. Latham was again re-elected President, and the Society held a splendid fair on the 7th and 8th of September.

At the annual meeting in March, 1848, Dr. I. G. Jones was chosen President, in place of Mr. Latham, whose ill health prevented him from discharging the duties of the office. In this year the Society lost its most active and efficient member since its organization, in the death of Mr. Latham, which took place on the 21st of April. Mr. Latham had devoted much time and means to advance horticulture, and was ardently devoted to it. The fourth annual fair was held September 5th and 6th, and was the best yet held, there being the largest display of fruits and flowers. The premiums awarded amounted to quite a large sum.

The Columbus Horticultural Society was incorporated by a special act of the Legislature, passed March 13th, 1849, which was unanimously accepted by the Society May 26th, 1849. Under the act the constitution and membership then existing was continued.

In 1849, Dr. I. G. Jones was re-elected President, and so continued until his death.

The prevalence of cholera in the years 1849 and 1850, prevented the Society from doing much more than to keep up its organization.

In 1851, the Society resumed active operations, although the late frosts of spring destroyed nearly every variety of fruit. Large accessions were made to the membership; and an increased zeal manifested for the advancement of horticulture among the citizens. The Society was firmly established, and seemed destined to exert a great influence in the promotion of correct taste in horticultural pursuits.

Early this spring (1851) the members of the Society began to discuss the expediency of establishing a "Society" garden. After some conference among the members, Mr. Benj. Blake, on the 24th of May, introduced a resolution into the Society, that a committee of five members should be appointed, to inquire into the expediency of establishing a garden, and, if expedient, to report a plan of operations. This resolution was unanimously passed, and Messrs. B. Blake, John Miller, Geo. G. Comstock, Adam Sites and H. C. Noble were appointed. This committee reported May 31st, discussing the subject at length, and concluding that further and more definite information being necessary, asked further time to receive offers of land and report. The time was extended four weeks. On the 5th of July the committee reported that they had received several offers of land on which to establish a garden; that they had carefully examined all the lands offered; that the piece offered by Mr. Samuel Barr was preferred by the committee. This piece, consisting of ten acres, is situated on the west bank of Alum creek, about two miles from High street, on the Granville plank road. It is accessible, beautifully situated, partly wooded, and fertile. It consists of ten acres, and as Mr. Barr offered it for two hundred dollars, on condition that it should be used for a garden five years, and as this sum, with one hundred and eighty dollars additional, had been raised by others interested in lands in that vicinity, the committee recommended the acceptance of Mr. Barr's offer. The Society unanimously accepted the offer, and appointed Henry Stanbery, Esq., H. C. Noble, and Benj. Blake to receive a conveyance. The conveyance was made, and is recorded.

The foregoing historical sketch was prefixed to the Constitution published in 1851. At that time there was every prospect of a very prosperous career opened before the society. The project of a park and garden was delusive. After spending a large sum of money, in fencing and ditching the ground, and underbrushing and trimming the trees, it was found that the cleared ground was too wet for a garden. It was at last given up. In the meanwhile, the Society found that its semi-annual exhibitions were so expensive that the receipts for attendance did not pay expenses. A debt was gradually created, and discouragement and decline followed. The officers and members made several efforts to revive the activity of the Society and failed. In 1866 Henry C. Noble was elected President, and on the 1st of April of that year the Society sold the ten acres purchased for a garden, to Jane Bell, who sold it to the Frankin County Agricultural Society. It forms a part of its grounds.

During 1866 the Society was active, but in 1868 the heirs of Samuel Barr brought suit for this land or its proceeds, on an alleged forfeiture of the condition of the deed. This action caused the Society again to suspend its active operations. The suit pended until February term 1872, when it was settled. The Society agreed in this settlement that $3,000 of the proceeds of said sale, and accrued interest, should be held by the Columbus Horticultural Society as a perpetual fund, to be called "The Samuel Barr fund for Horticultural purposes;" the principal to be invested by the said Society in secure investments, to be changed and renewed whenever the same might be deemed best, or become necessary, by the said Society, acting through its proper committee or officers, and the net annual proceeds thereof should be used for the advancement of Horticulture under the direction and control of said Society in the purchase of books and periodicals, or in such other manner as the said Society might from time to time determine. In case the principal sum of three thousand dollars should be diminished by any cause, the next accruing income thereafter of the principal fund remaining, should be applied to restore said principal to the full sum of three thousand dollars, and the income of said full sum should thereafter be used as above provided by said Society.

Owing to the fact that the purchase money was not paid for a long time after this, and no regular income realized therefrom, the Society made no effort to resume active operations. In the spring of 1878, the purchase money had all been paid, and the Council at once called together the few members who had kept their dues paid, and began a re-organization. A resolution was passed constituting all members of twenty years standing, who were not in default for their dues prior to 1868, Life-members. There were fifteen of these and one before. Their names are printed after the Constitution. These members caused the purchase money of the garden to be invested, and the Society feeling greatly encouraged, invited new members to join them, and renew the usefulness of this Society. Quite a number have joined. Their names are also given. In 1878, Henry C. Noble was re-elected President, and the other offices were all filled and the proper committees appointed.

On the 6th day of June, 1878, the Society held a Spring exhibition in the rooms of the State Board of Agriculture, and on the 24th, 25th and 26th days of September, 1878, it held a Fall exhibition in the City Hall.

The Society, at its annual meeting in May, 1879, elected Prof. N. S. Townshend President, Mr. Noble and the other old officers having declined a re-election.

It is hoped that the Society will now be able to maintain itself, and diffuse its beneficial teachings once more throughout this community, and that the young people of this city, those who are now establishing their homes here, will sustain it, and by it be enabled to beautify, not merely their own homesteads, but the streets and avenues of the Capital City.

The preceding was published in 1879. Owing to the lack of some records, the difficulty in completing an account of the Society up to the beginning of the publication of its proceedings regularly, was greatly increased. Even if slightly defective, the history following will prove extremely useful as covering the interval from 1879 to 1886, when publication was regularly undertaken.

June 13, 1879, the Society held an exhibition, at which eleven premiums were awarded on strawberries, one each on cherries and currants, two on gooseberries and eleven on plants and flowers.

September 28, an exhibition of fruits, vegetables, plants and flowers was given. Both these exhibitions were creditable, with a fair attendance.

June 11 and 12, 1880, the Society had a Spring exhibition, offering sixty premiums on fruits, plants and flowers. Twenty-three premiums were awarded, amounting to $28.25.

September 28 and 29, 1880, an exhibition was held at which sixty-six different premiums were offered ; but only the following were awarded: four on pears; six on apples; one on quinces ; six on vegetables and nine on plants and flowers.

In 1880, J. L. Stelzig was President of the Society. At that time, there were sixteen of the first Life Members living, now (June 1893) there are but eight.

In 1882, G. S. Innis was President, and he was followed by J. M. Westwater, who served several years, and was succeeded by Dr. N. S. Townshend. John J. Janney was Secretary until 1885, when W. S. Devol was elected.

In 1882, an exhibition was held in June, at which premiums were paid amounting to $104.25.

The Society had no fixed home, but had held its meetings wherever it could gain admittance; but a room in the Pioneer Block was rented and fitted up in which the meetings were held until November 1, 1884, when desk room was obtained in the Board of Trade room, in which the meetings were held until the removal to the Ohio Experiment Station in September, 1890.

As an illustration of the work of the Society, in 1884 papers were read on the following topics: Has fruit growing become unprofitable?; On the cultivation of the strawberry; Raspberries; Flowers; Pistillate and staminate strawberries; Some observations on the difference in temperature of mulched and unmulched ground; On fruits in general; On roses and foliage plants, and a very valuable paper on parks, by F. C. Sessions.

In the spring of this year, the Society planted a number of trees on the grounds of the Ohio State University, hoping to lay the foundation for an arboretum, or botanical garden.

In December, 1884, the Society tendered a reception and banquet to the members of the State Horticultural Society and the Legislature, then in session; and this was repeated in December, 1885, both occasions being fully attended and successfully managed. Both were preceded by an exhibition, and at the latter, Leo Weltz exhibited twenty-four plates of Russian fruits, procured by him on a recent visit to that country. The latter reception was closed by a ball.

At a meeting held in the City Park, August 22, 1885, an exhibition was held and twenty premiums offered, and at which F. C. Sessions read a well written paper on parks.

At the meeting in September, 1885, a revision of the constitution was adopted, and at the meeting, October 31, 1885, the Society held its last exhibition at which premiums were offered on fruits and flowers. At this meeting, the Society adopted a resolution favoring the establishment of a State Botanical Garden.

The proposition has been before the Society several times to hold its meetings at the residences of the members, but it has never been put in practice.

During the year 1885, papers were read before the Society on the following topics: The proper care of house plants; On the cultivation of flowers and plants; How to plant a tree; The circulation of sap in plants; Noxious and injurious plants, and the following were discussed orally: Care of lawns; Currant and cabbage worms; Strawberries, variety and cultivation; Tobacco as a fertilizer, and a Botanic garden.

The history of the Society from the year 1886 can be found in the volumes of the Journal, which was issued monthly until 1890; since then as a quarterly.

With regard to "The Samuel Barr Fund for Horticultural Purposes," it is proper to state that owing to careful investment, the Society now holds $5,000, 7 per cent. First Mortgage Bonds of the Columbus and Toledo Railroad Company, and $500 of Columbus 6 per cent. Street Improvement Bonds. The latter amount ($500) represents accrued interest on the permanent investment.

ACT OF INCORPORATION.

AN ACT

To Incorporate the Columbus Horticultural Society.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That Francis Stewart, John Miller, Joseph Sullivant, I. G. Jones, Adam Sites, Lucian Buttles, Benjamin Blake, William Merion, M. B. Bateham, Samuel McClelland, Thomas Stockton, Samuel Medary, A. H. Lazell, John Burr, Alexander E. Glenn, their associates and successors, be, and they are hereby incorporated by the name and style of the Columbus Horticultural Society, for the purpose of encouraging and improving the science and practice of horticulture, and promoting the propagation of the various species of trees, fruits, plants and vegetables, and the introduction of new species and varieties, and for no other purposes whatever.

SEC. 2. That said Columbus Horticultural Society shall have power to adopt a constitution and by-laws, not inconsistent with the laws of this State, for the regulation of the Society; to receive donations and bequests for promoting its objects; to levy and collect assessments on the members; to enforce the payment of such assessments by suit; to purchase, receive, occupy, hold and convey any real or personal estate, which may be necessary to carry out the object of their association; (provided the same shall not exceed in value the sum of ten thousand dollars); to elect officers and appoint agents to transact their business, manage and apply the funds, discharge the functions, and promote the objects thereof, and to commence and defend suits, and to use a corporate seal.

SEC. 3. That the three first persons named in the first section of this act, shall have power to call the first meeting of the corporators and organize the corporation.

JOHN G. BRESLIN,
Speaker, House Representatives.
BREWSTER RANDALL,
Speaker of the Senate.

March 13, 1849.

CONSTITUTION.

NAME AND OBJECT.

SECTION 1. This Society shall be known as the COLUMBUS HORTICULTURAL SOCIETY.

SEC. 2. The object for which it is organized is the advancement of horticultural knowledge.

MEMBERSHIP.

SEC. 3. Any person may become a member of the Society by the payment of one dollar. Wives and daughters of members shall be members without the payment of any fee. Male members shall pay an annual fee of fifty cents, in advance, which shall be for the year ending with the next succeeding annual meeting; and no member shall have the right to vote, or other privilege of membership of the Society, so long as such annual fee shall remain unpaid. Any lady resident in Franklin County may become a member without any fee.

SEC. 4. Any person may become a life member of the Society upon payment of ten (10) dollars, which shall be in lieu of all assessments or annual dues; and all persons who have been members for twenty or more years, and have paid their regular dues, shall be life members.

SEC. 5. Any person distinguished in horticulture, upon the recommendation of the Executive Committee, may be elected an honorary member of the Society by the affirmative vote of two-thirds of the members present at any regular meeting. Honorary members shall not have the right to vote nor incur any of the liabilities of members, but they shall be admitted to all meetings and exhibitions of the Society.

OFFICERS.

SEC. 6. The officers of the Society shall be a President, Vice-President, Secretary, Treasurer and an Executive Committee of three members, all of whom shall be elected by ballot at every annual meeting on the last Saturday in December, and shall serve until their successors are elected.

SEC. 7. The President, or, in his absence, the Vice-President, shall preside at all meetings of the Society and of the Executive Committee. In the absence of both, a President *pro tem.* shall be appointed.

SEC. 8. The Secretary shall keep a record of the proceedings of the Society, and attend to all necessary correspondence. He shall also receive all moneys due the Society for membership, annual fees and assessments, and pay over the same to the Treasurer; and shall receive as a remuneration for his services the sum of fifty (50) dollars per year.

SEC. 9. The Treasurer shall receive from the Secretary all money and funds belonging to the Society, and shall be the custodian of all bonds, stocks and securities belonging to the Society, and shall pay out and transfer the same only on the order of the Society, certified by the President and Secretary; and he shall keep an account of the receipts and disbursements, and report it to the annual meeting; and shall give such bonds as the Executive Committee may require.

SEC. 10. The Executive Committee shall have control of all exhibitions, and have a general supervision of all matters pertaining to the welfare of the Society. It shall have power to call special meetings whenever, in its judgment, it shall be necessary.

SEC. 11. The chairmen of the standing committees shall be elected at the annual meeting, and such chairmen shall have the power to appoint the other members of their respective committees.

SEC. 12. The following standing committees shall be elected:

1. On Botany.
2. On Vegetable Pathology.
3. On Entomology.
4. On Meteorology.
5. On Library.
6. On Fruits.
7. On Plants and Flowers.
8. On Vegetables.

INVESTMENTS.

SEC. 13. The Executive Committee shall make and manage all investments. No investment shall ever be changed without the reccommendation of said committee, approved by two-thirds each of the members and life members of the Society; nor shall the present invested fund of the Society ever be reduced in amount; but if it should become so by any unavoidable cause, the income shall be invested until the full amount is restored.

SEC. 14. The funds of the Society shall be invested either in the bonds of the United States, the State of Ohio, the City of Columbus, or Franklin County, Ohio; or in loans at not exceeding the legal rate of interest in the State of Ohio, payable semi-annually or annually, and secured by first mortgage on unencumbered real estate, situated in Franklin County, Ohio, of the value of twice the amount of the sums loaned thereon, exclusive of buildings and improvements.

AMENDMENTS.

SEC. 15. This Constitution may be amended at any regular meeting of the Society: Provided, such proposed amendment shall have been submitted, in writing, at least one week before such meeting.

BY-LAWS.

ORDER OF BUSINESS.

SECTION 1. The following shall be the order of business at every meeting, unless changed at the time by the vote of the meeting:

1. Reading the minutes of the preceding meeting.
2. Unfinished business.
3. Election of members.
4. Reports of special committees.
5. Reports of standing committees.
6. Communications and correspondence.
7. Regular paper or address and discussion.
8. Miscellaneous business.
9. Adjournment.

TIME OF MEETING.

SEC. 2. Regular meetings shall be held on the last Saturday of each month, at 2:30 p. m. (Local Time).

COLUMBUS HORTICULTURAL SOCIETY

1892.

OFFICERS.

HORACE WILSON,	*President.*
JOHN J. JANNEY,	*Vice-President.*
AUG. D. SELBY,	*Secretary.*
GEO. W. SINKS,	*Treasurer.*

Executive Committee.

W. J. GREEN, O. W. ALDRICH, MRS. N. E. LOVEJOY.

Chairmen of Standing Committees.

Botany,	AUG. D. SELBY.
Vegetable Pathology,	W. A. KELLERMAN.
Entomology,	F. M. WEBSTER.
Meteorology,	WM. R. LAZENBY.
Library,	JOHN J. JANNEY.
Fruits,	O. W. ALDRICH.
Plants and Flowers,	WM. C. WERNER.
Vegetables,	R. J. TUSSING.

LIFE MEMBERS.

Wm. G. Deshler,
John Graham,
Alex. Houston,
G. S. Innis,
J. J. Janney,
J. K. Jones,
Mrs. J. H. Klippart,
Mrs. N. E. Lovejoy,
Wm. Merion,
C. A. Platt,
John M. Pugh,
Geo. W. Sinks,
N. S. Townshend,
J. M. Westwater,
Horace Wilson,

Of Columbus.

W. S. Devol, of Riverside, Cal.

MEMBERS.

O. W. Aldrich,
E. E. Bogue,
Mrs. Jos. Bradford,
Mrs. J. H. Brenneman,
Mrs. Henry C. Bruenning,
C. W. Critchfield,
Mrs. Cathcart,
Jno. G. Deshler,
Miss Freda Detmers,
Jno. L. Gordon, Jr.,
W. J. Green,
C. J. Hardy,
J. S. Hine,
Thos. F. Hunt,
D. S. Kellicott,
W. A. Kellerman,
Mrs. E. B. Kimball,
Albert Knopf,
J. H. Lageman,
Wm. R. Lazenby,
Mrs. P. J. Lofland,
A. W. Madden,
Mrs. A. W. Madden,
Edward Orton,
Chas. Parrot,
A. D. Rodgers,
R. M. Rownd.
Aug. D. Selby,
G. P. Sperry,
Mrs. Jos. Sullivant,
H. A. Surface,
W. S. Turner,
Wm. C. Werner,
E. V. Wilcox,
E. M. Wilcox,
Mrs. Horace Wilson,
McLee Wilson,

Of Columbus.

Wm. B. Alwood, ... Blacksburg, Va.
F. W. Barr, ... Brice, O.

Chas. Bruns,
Dan'l Detwiler,
B. F. Gayman,
Philip Game,
Isaac Lehman,
Welton Seymour,
R. J. Tussing,
E. S. Tussing,

Of Canal Winchester, O.

MOSES CRAIG,	Corvallis, Ore.
M. CRAWFORD,	Cuyahoga Falls, O.
NELSON COX,	Ensee, O.
C. L. DICKEY,	Central College, O.

F. P. DILL,
J. W. EVERAL,
A. B. KOHR,
L. H. MCFADDEN,
H. WARREN PHELPS,

Of Westerville, O.

E. C. GREEN,
CHAS. E. THORNE,
F. M. WEBSTER,

Of Wooster, O.

C. R. ELSEA,	Lithopolis, O.
JAS. T. MILLER,	Marble Cliff, O.
MRS. EMMET MIX,	Avenue, O.
MRS. T. O. PHINNEY,	Clintonville, O.
W. R. PARSONS,	Worthington, O.
MRS. J. M. WETMORE,	Worthington, O.
F. RIEBEL,	Galloway, O.
J. N. RILEY,	Washington C. H., O.
MRS. E. THOMAS,	Camp Chase, O.
CLARENCE M. WEED,	Hanover, N. H.

HONORARY MEMBERS.

GEO. W. CAMPBELL,	Delaware, Ohio.
B. W. CARLISLE,	Lancaster, Ohio.
J. A. FETTERS,	Lancaster, Ohio.
R. G. HANFORD,*	New York.
J. J. HARRISON,	Painesville, Ohio.
GEO. M. HIGH,	Middle Bass, Ohio
W. H. LATHAM,	Indianapolis, Ind.
WM. MCKELLER,	Lancaster, Ohio.
N. OHMER,	Dayton, Ohio.
S. B. PORTER,	Columbus, Ohio.
W. B. STOVER,	Akron, Ohio.

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*Deceased February, 1892.

JOURNAL

OF THE

Columbus Horticultural Society.

VOL. VII. COL., O., MARCH, 1892. No. 1.

PROCEEDINGS OF THE SOCIETY.

JANUARY.

The Society met in Columbus, January 30th, 1892, a large attendance greeting the speakers. Upon dispensing with the usual order of exercises the Society proceeded to the regular program which was devoted to Mushrooms, to-wit:

Mushrooms for the Table, by Prof. N. S Townshend.

The Culture of Mushrooms, by W. S. Turner.

The Future of Mushroom Growing, by E. C. Green.

Empusa Aphidis, a Fungus on Plant Lice, by Freda Detmers.

Prof. T. F. Hunt was elected to membership.

Prof. Webster submitted a report on Entomology and Prof. Lazenby on Meteorology, the lowest temperature being—18°.

Mr. Dill said that the prolonged snows had caused rabbits to inflict serious damage to small fruit trees in some places.

Mr. Janney suggested that it might be well for some representative of the Society to see Mrs. Noble in regard to books for the Society, about which Mr. Noble had written to the Secretary a short time before his death.

A bill of the Secretary for postage, $4.29, and one for electrotypes of insects, $2.90, were approved and ordered paid.

The Secretary announced that the next meeting would be held upon invitation, at the office of the Franklin Park Floral Co., on Fair Ave., and the program devoted to Commercial Floriculture.

All were invited to examine the mushroom beds in the Station greenhouses.

By resolution, members were requested to send copies of last year's JOURNALS and *duplicates* to the Secretary for binding.

The Society then adjourned.

FEBRUARY.

Society met in office of the Franklin Park Floral Company, February 27, 1892, and in the absence of the President and Vice President, Dr. O. W. Aldrich was chosen President *pro tem.*

Mr. A. W. Madden and wife, and Mr. Albert Knopf were elected to membership.

Dr. Aldrich submitted a report on fruits, showing a very unfavorable condition of peaches and other fruits due to severe winter.

The Secretary reported the death of R. G. Hanford an honorary member of the Society, in New York City.

The motion prevailed to appoint a committee to draft a suitable memorial. Dr. Aldrich left the announcement of same to President Wilson.

The regular program was then carried out:

"Commercial Floriculture in the United States," by Aug. D. Selby; "History of Floriculture in Columbus," by Albert Knopf. "Some Fungous Diseases of Greenhouse Plants," by Prof. W. A. Kellerman. A very interesting discussion as to treatment of plants attacked by "damping off" fungus, appears elsewhere.

The subject of "planting out," was suggested for next meeting.

The thanks of the Society were voted to the proprietors ot the greenhouse, and to Mr. Knopf in particular for courtesies received. Upon adjournment members were kindly shown over the greenhouses.

MARCH.

Society met at the Experiment Station March 26, 1891 with Prof. Webster, President *pro tem*; Mr. M. Foster, of Piketon, was elected to membership.

Prof. Webster reported the mite upon the cucumber beetle as having appeared very early and in considerable numbers, thus pointing to possible relief by their attacks.

Dr. Aldrich reported peaches, pears, &c., much injured by winter.

Mr. Riebel said he had been unable to find a good peach or pear bud; with him Cuthbert raspberry is in good condition.

Mr. Tussing reported his raspberries (Shafer's) as killed to the ground. Mr. Bruns substantiated Mr. Riebel's report. Dr. Aldrich stated that reports from Delaware indicate that peaches there are killed and Prof. Webster said the same is reported from Mississippi as far south as Jackson.

Prof. Lazenby reported considerable damage to fruit trees of eastern Ohio from heavy ice of February.

Of vegetables Mr. Green said Henderson's Rapid Forcing Radish has been found best at the Station, and likewise Grand Rapids Lettuce. Mr. Tussing said Grand Rapids was the lettuce for him.

Dr. Aldrich exhibited sample of dried fruit of so-called currant-crab, from Illinois. An unusually good program was then carried out.

Special subject—Planting Out.

Planting Melons and Cucumbers, by R. J. Tussing.

Onions and Other Root Crops, by E. C. Green.

Varieties of Fruit for Franklin County, by Dr. O. W. Aldrich.

Trees and Shrubs for Small Grounds, by Prof. Wm. R. Lazenby.

An interesting discussion followed the papers.

Dr. Townshend read a very interesting extract from a paper by Mr. Harding on "The Bonnie Broom."

Upon retiring, owing to lateness of the hour, Mr. Tussing said the time of meeting is too late for those who, like him, live out of the city. He suggested 10 o'clock a. m. as an appropropriate time, or to meet promptly as early as 1 p. m. This matter was referred to the Executive Committee.

A bill of $3.00, reduced subscription to *Garden and Forest*, for one year, was allowed and ordered paid.

Instructions were given to purchase a set of Prof. L. H. Bailey's "Annals of Horticulture," also to secure pamphlet cases for the Society library.

There being no further business, the Society then adjourned.

AUG. D. SELBY.
Secretary,

EDITOR'S TABLE.

With this number the JOURNAL begins its Seventh Volume. From present indications the forthcoming volume will compare satisfactorily with its predecessors. Certainly, the working membership has never before been superior, either in numbers or activity.

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The action taken at the last meeting to secure Prof. Bailey's Annuals of Horticulture and pamphlet cases for the Society library, is in the right direction. Many members of the Society look to the library as a source of information upon the subjects the organization is pledged to promote a knowledge of—perhaps, to buy more books and to furnish rather less printed matter than formerly, would suit all.

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Attention is called to the provisional list of varieties of fruits for Franklin county given in this number. Through the co-operation of those interested, the list may set forth when corrected at the end of the year just what seems most likely to prove profitable for growers in our vicinity.

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The practical papers on "planting out" and "culture," appearing in this number, are of more than ordinary value. In one, Mr. Tussing demonstrates the possible in cucumber and nutmeg melon growing even where the gardener is harassed by beetles; Mr. Green shows important points in onion growing, and Mr. Turner points out the feasibility of mushroom growing under the ordinary circumstances of the greenhouse culturist. This matter of mushrooms is well worth another "push" from the Society next year.

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Professor Lazenby's suggestion as to growing mushrooms in rich pasture land certainly merits a trial, if not in an extended, at least in a limited way. Who will be the person to do it?

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In the death of Mr. Francis C. Sessions, the Society loses another valuable member, and a former officer. His great interest in horticulture, or rather I may say floriculture, is known to everyone who ever passed his home during the flower season. We lose such men as he, all too soon.

Before the next number of the JOURNAL is issued, we shall have had a chance to put into practice the plans to increase the social feature discussed at the annual meeting. Is this to meet with co-operation or lack of interest on the part of members?

* * *

The Secretary is in receipt of Part II., transactions of Massachusetts Horticultural Society for 1890. The report of the Secretary and Librarian shows that the Library of the Society, included in 1890, 6,018 books and 5,889 pamphlets. Accessions to the library by purchase are in part provided for by the Stickney Fund of $12,000, the income from which is available until 1899, when the fund reverts to Harvard College.

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From the membership account of the Massachusetts Horticultural Society, it appears that there were, in December, 1890, 562 life and 215 annual members.

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The committee of the Biological Club, appointed to arrange excursions for the spring of '92, has reported the following very excellent list: April 16, to Sugar Grove; April 23, to Central College; May 7, to Georgesville; May 14, to Groveport; May 21, to Worthington; June 4, to Morgan's Station; June 11, to Alum Creek Station; June 18, to Licking Reservoir; (Thornport). Also a provisional date for Mad River Cedar Swamps, near Urbana. Reduced rates will be obtained on all these excursions and a large party is always desired. Ladies are cordially invited to join the parties.

COMMUNICATIONS AND DISCUSSIONS.

MUSHROOMS FOR THE TABLE.

BY PROFESSOR N. S. TOWNSHEND.

In Ohio and other states, hundreds of thousands of bushels of nutritious and palatable mushrooms which grow spontaneously in pastures are annually wasted because some of our people are not aware of their good qualities, and others hesitate to use them for fear they are not able to distinguish edible from poisonous varieties. The common mushroom which is known to botanists as *Agaricus campestris* is found in all parts of the country, from north to south, and from east to west; this is the most reliable mushroom for the table because it grows almost everywhere, and is readily distinguished from dangerous species. When growing spontaneously in open fields it comes to perfection in September; it may, however, be successfully cultivated under shelter, and in that way it is made available at all seasons. This mushroom when it first appears above the surface is entirely white, the pileus or cap is bent down and attached to the stem by a thin white membrane, as growth proceeds this membrane is broken, and a part of it forms a ring around the middle of the stem. The pileus or cap for a time is convex above, and concave beneath, but later both upper and under surfaces become horizontal. The laminæ on the under side of the pileus are straight and regular, pink in color, and of an agreeable odor; but as the mushroom gets older, the color changes to brown.

Another species, *Agaricus arvensis*, resembles the *campestris* except that usually it is larger, and consequently is sometimes called the Horse mushroom; it is not quite as delicious as the campestris but is equally wholesome, it is nowhere cultivated. This species is sometimes found growing in rings many yards in diameter. The rings are easily accounted for. A single mushroom grows through the season, its mycelium or what appear like roots, spread horizontally in all directions and exhaust the space they cover of all nourishment; the next year the outer margin of the mycelium or spawn starts up a new crop of mushrooms making a ring around an empty circle. This goes on from year to year, the ring continually enlarging. In former times these rings were supposed to be the places where Fairies had dances.

Another species which some prefer to the common mushroom is the Morel or *Morchella esculenta* which has a tall stem to which the fleshy part is attached in the form of a cone. This species is not widely distributed over the country, but where found it is apt to be highly appreciated. The Morel perfects itself in May, and many fine specimens are annually found in the immediate vicinity of Columbus. It does not appear to be susceptible of cultivation.

The truffle *Tuber cibarium* is much esteemed in Southern Europe, but is not found here. This is a little dark brown ball somewhat larger than a walnut. It grows entirely underground, and has a delightful and powerful order. It is only obtained by the training of dogs to be truffle hunters. In France, pigs are trained for a similar purpose.

Another fungus which grows abundantly in the United States is the *Lycoperdon giganteum*, better known as the puff-ball. This is not only edible, but palatable if gathered when young. The ball should be skinned, sliced and fried, and is a tolerable substitute for better varieties when they are not at hand. Very many other varieties are also edible, and are in common use in different countries; reference is here made to a very few which are easily distinguished and with which all persons should be familiar.

Although not a professional cook, a word or two in regard to the preparation of mushrooms for the table may not be out of place. Mushrooms may be skinned, then fried; a little butter, salt, and pepper should be added before or after cooking; or they may be stewed and when cooked in this way many prefer them to oysters. Small mushrooms are readily pickled in a suitable portion of vinegar. Extensive use is made of mushrooms in Europe for the manufacture of ketchup which appears daily on almost all well furnished tables. It is used as an agreeable seasoning for many kinds of meat. Some species which are not directly used as food, are not found to be hurtful if made into ketchup. The value of mushrooms as food may be inferred from their analysis: When fresh they contain 90 per cent. of water; of the remaining 10 per cent of solids, 5 per cent. is albumenoids, 4½ per cent carbohydrates, and the remaining ½ per cent. mineral.

It would require too much space to give a list of all known edible and poisonous fungi; a few generalizations which will enable any one to distinguish the edible from the hurtful may be of service. Edible mushrooms are usually found in dry and airy places; they are white, pink or brown in color, and the color does not change when they are cut or broken; they have a compact brittle flesh, the juice is watery, the odor is agreeable, and the taste is not bitter, acrid, salt or astringent. Poisonous mushrooms grow more in clusters and in damp places; they usually have bright colors, their flesh is tough, or soft and watery; they acquire a brown, green or blue tint when cut, and exposed to the air, the juice is often milky, the odor is strong and disagreeable, and they have an acrid astringent, acid, salt or bitter taste.

MUSHROOM CULTURE.

BY W. S. TURNER.

Mushroom culture is, in a certain sense, by no means a "mushroom" business. It will not even come to a person in a day or a night. I do not think one can become an accomplished mushroomist without much careful experience and a good degree of sound judgment.

The first step a person must take, who sets out to grow mushrooms is to secure suitable manure, as "*Agaricus campestris*" is always found on or near a manure pile, both in its natural and cultivated state. Nice, fresh horse manure can be secured about the alleys of Columbus with but little expense. From the Station here, three or four loads can be hauled per day. Care should be exercised in selecting fresh manure that is not fire-fanged nor too much bleached. If it has started to ferment, so much the better, as it can be got ready for the bed so much the quicker. If gathered too dry and fresh, time must be given to start the fermentation. I do not think manure with saw-dust and shavings suitable, although I have no means of knowing definitely. Care should also be taken to pick out all foreign stuff, such as pieces of wire, tin cans, old boots and cloth, as the spawn or mycelium does not seem to take kindly to such things. After the manure has been thrown in a conical pile, it will soon begin to heat rapidly; turn the pile at least every two days, so as to secure even heating to all parts. If it is quite moist, shelter the pile from heavy rains, and water if too dry. The manure is too wet if you can squeeze water out of it by catching up a handful, and it is too dry if it will not pack well.

The pile should be turned at least twice before putting into beds; more times will not harm. Some nice, loose soil may be added to the pile at the last turning, not to exceed one-fifth in bulk, and a tenth will be sufficient to absorb nearly all the unpleasant odor which might become obnoxious in a close room, or spread through the building if it were taken into a cellar. Make the bed eight to twelve inches deep, and of a width that suits; pack firmly with back of shovel as you proceed. Put a thermometer in the bed as soon as it is finished, placing the bulb down three or four inches from the surface. Within three or four days the temperature should go up to 100°, or 120° if the manure is in prime condition. If the heat should reach over 130° the bed will have to be turned over to cool it; if it does not heat 10° or 15° above outside temperature, liquid manure must be added. When the thermometer has gone down to 75° to 80° the bed is ready for spawning.

Spawn can be secured of nearly all the seedsmen. Usually two kinds are advertised, the pound cakes or English, the loose flakes or French; the only difference being the former is pressed into cakes and dried, the latter simply dried when the mycelium has grown through the manure and before the bulbs of mushrooms begin to form. Break the cakes into pieces about one and one-half inches square, make a hole in the bed about three inches deep and ten to fifteen inches apart; place the spawn in these and pack the manure firmly over it with your hand.

If the thermometer stands as low as 65° or 70°, case the bed at once with about two inches of fine loamy soil; if the temperature is 80° or 85°, do not case for eight or ten days, as the heat is nearly always increased by covering, and there may be danger of killing the spawn.

From eight to twelve weeks from spawning, you may look for mushrooms. If the bed gets too dry, it may be watered lightly with a fine spray; warm water at a temperature not to exceed 85° or 90° is preferred.

We have estimated the cost of making our beds at seven or eight cents per square foot. The total cost, including picking and marketing would not exceed 10cts. We have never estimated the crop here, but authorities say three-fourths to one pound per square foot, so mushrooms may be grown with reasonable profit at twenty-five to thirty cents per pound. From fifty cents to one dollar thirty-five cents per pound are the prices in this city.

Mushrooms are grown in various places, out of doors, in sheds, dug-outs, cellars, greenhouses and caves. They are grown about London, England, out of doors nearly all winter, the beds being protected by the strawy part of the manure which has heen thrown out in turning. They are also further protected by spreading coffee sacks, old carpets, etc. over them.

The catacombs of Paris are used to grow mushrooms quite extensively; they are grown about New York, in greenhouses as we do, both under the benches and on the benches. A protection from drafts and hot sun is needed when grown on the benches. Caves are said to be excellent places for mushroom growing. I should think a combination of green house and cave, with the green house over the mouth of the cave, in order to keep the cave warm, would be an excellent plan. Dug out cellars are made with but little expense, the roofs of which can be removed during the summer and the place thoroughly dried out.

The most necessary things to success in growing mushrooms are, experience, suitable manure and a suitable place to grow them.

THE FUTURE OF MUSHROOM CULTURE.

BY E. C. GREEN.

One hardly needs the eye of a prophet to tell the future when he judges it by the past. But to judge the future of mushroom culture by the past of other vegetables, throws a light on the subject that no other way will secure. For in the horticultural world we have so many examples, where a species of plants come to the front, when but a few years before they were hardly known.

In the strawberry we have a shining example. It is in the memory of persons not greatly advanced in age, when the use of the strawberry was a rarity, when the only fruit of this kind was received from nature's hand. Now hundreds of bushels are consumed where but a few were used in times not long past. Yet the strawberry is by no means a new thing, it is its extensive cultivation that is new.

Celery and tomatoes have come to us in a similar measure. Our worthy Secretary read before this Society last year an article on "The History of the Cultivation of Celery," in which he says it was first cultivated in 1629, but even the youngest of us can almost remember when it came into general use in this country. But it is needless to dwell on these examples.

Some may say that these instances are not parallel cases with the mushroom for they are plants of an entirely different order. This seems one of the strong points in the mushroom's favor. It appears to occupy a place that has not before been filled.

Why has not the growth of the lower orders of plants been more general? I can hardly answer, unless it be a certain ignorance and superstition in the minds of those who have had this work to do.

The man of science grows in his laboratory many plants more difficult of understanding than the mushroom. Why should the gardener make a failure of these? I do not think he will when he has the dollars and cents so plainly held up before him as he has at the present time. The money that there is in it will lead to success sooner or later.

In the other vegetables I have mentioned a market had to be created, but in the case of mushrooms the market is already here, and one to which the supply has never been equal. Mushrooms are not only a dainty for the epicure but a substantial force as well. Another reason for the growth of mushrooms is that they are distinctly a winter crop.

Those who have had anything to do with the growing of winter vegetables know that it is not the weeds of summer that make the trouble, but the mildews, rots, etc., that destroy the growing plants; these growths are of the same order of plants as the mushroom. The cause of the rots and mildews lies in the fact that while we may control the heat and moisture to a large extent we cannot control that most important factor in the life of the higher orders of plants—sunlight.

The short and cloudy days of winter, while they prove a detriment to the sun-loving plant have but little effect on the lower forms of plant life. It is at such time the fungi may be grown successfully. Another reason for their growth is that while the mushroom is grown in manure, it takes nothing (?) from that manure that other plants need, so that the gardener may be well paid for the use of it in his mushroom bed, and then have it in fine shape for out-door crops. It is like eating your pudding and having it left too. Thus it seems there are strong reasons why attention should be paid to this crop. And already we see an interest in it that has not been seen before.

A few years ago hardly a seedsman catalogued the spawn, but this year there is no catalogue of note that does not give it a prominent place. Thus we see the demand increasing. Books, magazines and the Department of Agriculture are giving instruction on the subject. I doubt not but some experiment station will soon publish a bulletin on it.

And now for a little speculation. In the parallel cases of other vegetables I have mentioned, we find that man has, by selection and cultivation, brought plants to such perfection that they would hardly be recognized when compared with the originals. Can not and will not the same thing be done with the fungi? I think so, but I also believe that some other forms may be used.

Look at the Giant Puff Ball from which one may take a slice every morning for a week. By the growth that they sometimes make, a man could support a family from a city back yard. The banana, which yields forty-four times as much as the potato, will have to take a back seat.

Sir Bulwer Lytton in his fanciful Tale of the Coming Race, peoples the interior of the earth with a superior race of beings whose diet is wholly vegetarian and therefore must be fungi. Perhaps the coming race of man is forshadowed by this. It is an old saying that the man who makes two blades of grass grow where one grew before is a benefactor of his race, therefore is the man who makes a crop grow where it is impossible for even a single blade of grass to grow, deserving of less praise?

The following analyses of mushrooms were kindly furnished by Prof. H. A. Weber:

ANALYSES OF MUSHROOMS.

	Mushrooms.	Morels.	White Truffles.
Protein	4.68	4.40	9.95
Fat	0.39	0.56	0.44
Carbohydrates	3.45	3.68	15.15
Water	91.01	90.00	73.34
Ash	0.45	1.26	2.10

DISCUSSIONS.

Prof. Lazenby said that in conversation with Mr. Pullinger, horticulturist at Insane Asylum, some different points were brought out. The best temperature for the bed is about 57° to 58° with variation above and not below that temperature—never so low as 45°. After the first crop has been gathered, half an inch of loam may be added and a second crop will appear in 3 to 5 weeks. Prof. Lazenby said further that it seemed to him feasible to undertake

OUT-DOOR MUSHROOM CULTURE.

Where one has good rich pasture or meadow land, the sod may be cut in May or June and pieces of spawn of the size of a hickory-nut inserted to a depth of two inches, say, one to every square foot. This would not require over $3.00 worth of spawn to the acre, and would no doubt produce a fine crop without additional expense.

"I think that an exaggerated value is put upon the nutritive qualities of mushrooms, and that while they are unquestionably good as food, the value is much below that of milk or peas or such things."

Mr. Turner said that as to authorities, he placed more reliance on Falconer than on any one else.

Prof. Kellerman exhibited colored plates of all the more important edible and of some of the poisonous species. The Morel, he said, is very abundant in Kansas and is excellent in quality; the stem, which is hollow, should be cut as close to the ground as possible. In the matter of distinguishing poisonous and edible sorts, he said one ought to learn to know at sight the few edible species and to reject all others when collecting.

The statement made as to the mushroom, not taking anything from the manure of the bed, needs modification, since they undoubtedly extract a part of the fertility from the manure, although the improved condition may be a certain recompense for the loss of substance.

Mr. Surface stated that he had found the Morel under Elm, Black Walnut, and White Ash trees and in the sands along the Miami River.

Mr. Werner said that he had always found it most abundant in an old over-grown orchard.

A FUNGUS ENEMY OF PLANT LICE.

Empusa Aphidis.

BY FREDA DETMERS.

The genus Empusa belongs to the Entomophthoreæ and is peculiarly interesting on account of its having entomogenous forms only. Its hosts include all orders of insects. No species of the fungus is limited to a single species of the host; but often occurs on many genera of one order, and often on insects of different orders, as, for example: *Empusa sphærosperma* has been found on *Lepidoptera*, *Diptera*, *Coleoptera*, *Hymenoptera*, *Hemiptera*, and *Thripidæ*; it is also reported on *Neuroptera* in Europe.

The species I wish to speak of—*Empusa Aphidis*—has been found only on numerous genera of Aphides, and is reported by Dr. Thaxter in his work on the Entomophthoreæ of the United States, as especially destructive to the Hop Aphis, *Phorodon humuli*. *Phorodon pruni-mahaleb*, which, by some authorities, is considered synonymous with, and by others, a variety of *P. humuli*, is a very serious pest in the greenhouse. It occurs on radishes, onions, sparingly on lettuce, is especially abundant on turnips, and we have found them in the insectary on wheat, grass, clover, and every weed which grows there.

Besides the *Phorodon pruni-mahaleb*, a large pale green Aphis occurs on the lettuce. The Aphides appeared on the young lettuce plants before the latter were set out in the benches, and the fungus was noticed about the first of November. As the insects multiplied and appeared in the different houses, the fungus followed in their wake; the diseased ones soon outnumbering the healthy ones. The Aphides succumbed so rapidly to the parasite that for a while they were held in check. The fungus was equally effective on the Aphides infesting the radishes in the greenhouse. Soon these plants were all removed, a new crop took their place, and cold weather setting in at the time, the fungus was checked and the Aphides became very numerous again.

In the insectary, a small patch of turnips was sowed for experimental purposes. The under surface of the leaves was soon densely crowded with the *Phorodon mahaleb*, which was the only species found. They were mostly wingless, viviparous females. Before long a few diseased ones, conspicuous by their yellow color, occurred here and there. In less than a month they were as densely crowed with the parasitized insects, as they had been with the pale green, living ones.

Next to the turnips is a small patch of wheat, and near this some grass and clover; the Aphides were very abundant on all, and these too were soon laid low by the enemy.

There are several different species of Aphides in this insectary. *Aphis mali* is very abundant on patches of wheat and oats. These resisted the fungus for some time. In spite of a number of artificial inoculations, the first diseased one was found on wheat growing in close proximity to the turnips; and the Aphis must have come in contact with the parasitized Aphides on the turnip.

Another Aphis which resisted the fungus until I thought it invulnerable, is a small, shining, brown Aphis on a chrysanthemum. I repeatedly inoculated them with the disease. December 1st I placed some of the parasitized Aphides from the turnip among them, but without any result. December 16th, some of the dead Aphides were placed in a moist chamber until the spores had germinated; they were then crushed in water and applied with a brush to the chrysanthemum Aphis. December 24th, Aphides which were a creamy mass of spores were placed among them.

Up to this time no animal parasites—although abundant among other species—were found among them. A carnation, bidens, and another composite, all infested by plant lice which were attacked by the fungus, stood quite close to the chrysanthemum; but the small, shining, brown Aphis resisted the fungus successfully. Finally, on January 2d, I found two dead ones, and on examination found their bodies full of the typical hyphal bodies of *Empusa Aphidis*. The disease up to this date, January 30, has spread but slowly among them.

The Rose Aphis also resisted the fungus for some time, but it seems to be well established among them now.

To none of the species of Aphides is the fungus as destructive as it is to *Phorodon mahaleb*.

The external appearance of the parasitized insects varies a good deal. Those insects which are of a pale color, pale green, become yellowish when the fungus has gained entrance into the body, shortly before death they are brick colored or reddish, soon after death becoming bright yellow, and later when the spores appear the body loses its form and becomes a creamy or white mass, due to the vast number of hyaline spores. The parasitized brown Aphides retain their brown color until the spores appear, and though a lighter brown than the living, are not nearly so conspicuous as the green ones.

Temperature and moisture have a striking effect on the fungus. So long as the temperature was moderate the fungus kept the insects in check; but when colder weather set in and the temperature of the green house was allowed to fall, the fungus lost activity; and as the lower temperature had no effect on the insects they soon out-stripped the enemy.

Varying degrees of moisture have also a marked and rapid effect on the fungus. An undetermined species of Aphis of which the winged males and wingless oviparous females occur on Shepherd's Purse and *Nepeta glechoma*, in a breeding cage kept quite dry, was thought to be attacked by some other disease. The bodies were dark and much shrunken, with no indication of a fungus visible externally. On opening the bodies they were found to be full of the characteristic hyphal bodies; but these had not developed sufficiently to produce spores. On account of the nature of the host and the lack of moisture, the development had been checked before it reached the external surface of the host.

Some of the turnip leaves were lying on the ground, and partially covered by wheat; on these the parasitized insects lost their form and were a creamy mass of spores and fragments of hyphæ. In more exposed, and therefore drier situations, the insects although swollen by the fungus, retain their normal form and remain erect upon the leaf. Spores placed in water germinate in two hours. If insects which show no spores are placed in a moist chamber, in a few hours they will become a mass of spores.

This disease can be made of great economic value if it can be successfully spread among plant-louse infested plants which are difficult to spray, as for instance a grain field.

COMMERCIAL FLORICULTURE IN THE UNITED STATES.

CENSUS BULLETIN, 59.

BY AUG. D. SELBY.

By the eleventh census, commercial floriculture has for the first time been made the subject of an investigation, the results of which were set forth in a Bulletin (No. 59) issued April 29, last. The figures, though subject to revision, show many interesting features to be noted.

It seems that floriculture, as an industry, has been carried on for upwards of one hundred years, but that it is only within the last twenty-five years that it has reached large proportions. Out of a total of 4,659 establishments, 2,795 were started between 1870 and 1890, and of these, 1,797 between 1880 and 1890. There are 312 establishments owned and managed by women. The entire number of establishments devoted to commercial floriculture (4,659), had in use 38,823,247 square feet of glass, a space of more than 891 acres. The total products were $12,036,477 for plants and $14,175,328 for cut flowers.

The largest number of square feet of glass in any establishment was 150,000, in the District of Columbia, and the smallest, 60 square feet, a cozy attachment to the sitting room of a New England farmhouse, from which the lady owner sells annually, $35 to $50 worth of plants and flowers.

Geographically, the establishments are: North Atlantic States, 2,448, of which 793 are from New York; South Atlantic States, 293; North Central States, 1,466, of which the largest number for any State, 393, is reported from Ohio; North Central States, 212; Western States, 240, of which 150 are in California.

Going into date of establishment in more detail, it seems that in 1800 there was one commercial florist, only 3 started between 1810 and 1820; 8 more in the next ten years, 25 in the next, 45 betwen 1840 and 1850, 96 between 1850 and 1860, 313 between 1860 and 1870, 998 from 1870 to 1880, and 1,897 between 1880 and 1890. In other words, 80 per cent of the business has been developed within the last twenty-five years.

There are, it is to be noted, in the United States, besides the Society of American Florists, 965 State and local floral societies and clubs, and more than 358 horticultural societies, all which certainly are important factors in the rapid development of the taste for flowers which this business has sought to supply. Inquiries were made by the census authorities to determine as nearly as possible the rank attained by the various sorts of flowers. There is a great deal of specializing in growing sorts, and roses, both plants and cut flowers, appear to be in greatest demand. In the northern and eastern States the demand for plants is greatest for geraniums, coleus, roses, pansies, verbenas, heliotrope, carnations, chrysanthemums, palms, ferns and fuchsias, nearly in the order named.

In the South the call is for roses, chrysanthemums, geraniums, coleus, palms, and ferns; while in California the demand is for roses, carnations, chrysanthemums, geraniums, palms, and pansies.

Cut-flower sales show a variation or fashion in different markets; the greatest demand everywhere is for roses, followed closely by carnations. These two furnish about 65 per cent of the total value of cut flowers sold. Violets, chrysanthemums, lilies, hyacinths, smilax, bouvardia, heliotrope, pansies, and tulips, in the order named, supply 25 per cent more. The remaining ten per cent take the remaining sorts.

Most of the reports as to profits give roses as the most profitable, carnations second and violets third.

COMMERCIAL FLORICULTURE IN COLUMBUS.

BY ALBERT KNOPF.

Mr. Chairman and Gentlemen:

With pleasure I present to you this paper, entitled, "The Growth of Floriculture in Columbus, and its Developments."

There is a vast contrast in floriculture in our city today, and that of ten years ago; but when we hear the story of old Joe's time, we can not help but think that progress in commercial floriculture is equal to the progress made in any business during the past half century.

No doubt some of you were personally acquainted with Joe Weigand, or "Old Joe," as he was more frequently called, who came to our city nearly three score years ago, and had the honor, I believe, of being the first commercial florist Columbus had. Joe was a single man living alone in, and for his little green house at the corner of Long street and Washington avenue, where a few evergreens today mark the spot. His collection of plants consisted of common bedding plants, with a few climbing roses adorning the walls. The sale of pot plants was his chief income.

In the year 1855, the firm of Elwanger & Barry concluded to open a western branch of their Rochester nurseries, and decided upon Columbus as an available spot. They were represented by Capt. Stelzig, whose ability as a landscape gardener is known to every citizen. Great credit is due the Captain, considering his poor support, for furnishing our city with the beautiful landscape at the City Park.

Mr. Bateman was taken as a partner in this western branch of Elwanger & Barry, and remained as such for a number of years. The firm changed later on, and was in the hands of the late R. G. Hanford, when it met with financial reverses, and assigned in 1878.

The assignment of The Columbus Nursery, as it was called, was followed by the establishment of a number of small firms in addition to those in the city previous to its financial embarrassment.

Comparing our cut flower market to-day with that of only ten or fifteen years ago, we find a great increase in the demand in proportion to the population. The flower has not only sprung into such prominence in this city in the last few years, but such is the case in almost every city in our country. This marked increase in the sale is partly due to the reduction in the price on most of the varieties; while the reduction may be accounted for by comparing the cost of production of the present with that of the past.

If we glance back at the old establishments we will find that their greatest dependence was placed in climbing roses for their winter crop. To-day, on a bench with a three inch depth of soil we grow our finest roses, such as the Bride, the Wooton, Perle des Jardins, that elegant pink rose Catherine Mermet, and many other leading varieties.

On a space where hundreds of roses were grown a few years ago, we are now growing thousands, and are able to have them at all seasons of the year. Under the stages where the old florist would store his rubbish, the florist of to-day grows lilies of the valley, tulips and hyacinths.

The demand of years ago was for bouquets; loose flowers were scarcely called for. These flowers consisted of a general assortment, placed on wire, and when made up the bouquet was so compact and flat that the educated eye of to-day would ridicule such taste.

The demand to-day is mostly for loose flowers with long stems. There is some demand, however, for bouquets, and in preparing these we must not forget that flowers should not be arranged, but let them occur.

Four years ago there was but one cut flower store in our city, while to-day we have three, and it is gratifying to state that the demand is sufficient to assure them all success.

SOME FUNGOUS PESTS OF GREENHOUSE PLANTS.

BY W. A. KELLERMAN, PH. D.

At such a meeting as this, devoted exclusively to a consideration of subjects connected with commercial floriculture, it is quite proper that some account of destructive fungous diseases should be given. I have accordingly undertaken to treat briefly of a few of them, though not *practically* familiar with the usual management of the pests which are more or less prevalent in greenhouses.

Here as in animal pathology, a diagnosis of the case should if possible, precede the administration of remedies. In fact, without understanding the mode of development and nature of the parasitic organism causing the disease, including the conditions under which it thrives, a rational method of procedure looking toward its destruction, would hardly be possible. In the short time allotted to me, I will attempt to place before you the main features of at least two diseases, namely, " Carnation Rust," and " Damping Off."

CARNATION RUST.

The fungus causing Carnation Rust was described in 1789 by Professor Schrank, of Bavaria, under the name of *Lycoperdon caryophyllinum*. Persoon later gave it the name of *Uredo Dianthi*, and still later Niessel, detecting its true affinities called it *Uromyces Dianthi*. Schrœter restored the specific name first given by Schrank, according to the botanical law of priority, and the correct name is therefore, *Uromyces caryophyllinus* (Schrank) Schrœt.

It is a black rust, but differing from *Puccinia*, (a larger genus of black rusts) in having one-celled winter spores—not two-celled as in the latter genus. It has summer spores which are more delicate, not so dark colored. They germinate as soon as mature, thereby rapidly spreading the disease. The winter spores lie dormant during the winter and germinate in the spring.

The rust can be recognized on the leaves when round or oblong blotches appear, one-sixteenth to one-eighth of an inch long. These are slightly elevated above the surface of the leaf and at first covered by the dying greyish epidermis. The latter is soon thrown off, and then a mass of bright brown or blackish spores can be seen. The uredospores when placed under the microscope are seen to be, according to Winter, roundish or oblong in shape; the surface is covered with minute spines and the color is light brown. They are about 17 to 28*u* in diameter, and 40*u* long. The teleutospores (winter spores) are furnished with a long pedicel (4—10*u*), and they are roundish or occasionally oblong, brown in color, smooth on the surface, and have a clear apical thickening. The size of the spores is 22—35x15—23*u*.

The life history of this parasite has not been worked out in detail, but it is doubtless very similar to that of the other species of this genus which have been carefully studied. It belongs to the section (called *Hemiuromyces*) in which the spermagonial and æcidial stages are wanting (or at least yet unknown)—only the uredospores and teleutospores being known, and these, of course, occurring on one and the same host plant.

The fungus has long been known in central and southern Europe affecting *Dianthus prolifer*, *D. caryophyllus*, *D. superbus*, and *Gypsophila paniculata*. Neither Frank nor Sσraurer give this fungus in their works on Plant Diseases. But it has been recognized as an enemy in Italy, by Cavara. A specimen, accompanied by figures and description was issued by Briosi and Cavara in their *I Funghi Parassiti delle Piante Cultivate ad Utili* (No. 30), which is placed before you for inspection.

It is, according to Prof. Arthur in American Florist (VI, 587) only three and a half months ago that the first notice of this rust was published in the United States. It has been reported in Massachusetts, Pennsylvania, New York, Ohio, Michigan and Indiana. It was first thought that the disease was introduced by importations in 1891, but this is erroneous as Prof. Taft collected specimens in Michigan in 1890. Prof. Arthur further says: "It was probably established some places along the Hudson River two or three years earlier yet, as I am informed, that Mr. John Smith, now superintendent of Mr. Robert Craig's place in Philadelphia, claims to have personal knowledge to that effect. As far as present information goes, therefore, the distribution of carnation rust in America has been accomplished within four years."

The pest may become extremely troublesome, and it behooves all florists to make strenuous efforts to prevent its general diffusion and if possible by united, persistent and systematic efforts annihilate it.

No diseased branches should be used for cuttings. The parts that are affected, if not indeed the whole plant, should be promptly burned. Soil that might harbor the spores should be discarded. Soil only that is known to be free from the spores, or at least such as has not been in contact with or near diseased carnation plants should be used. The house should be fumigated with sulphur to kill any spores that may yet remain. Besides, avoid excessive moisture, and very high temperature, which, in all probability, favor the development of the pest.

Whether Bordeaux mixture or any of the copper compounds, or other fungicides used as a spray may be effectual, remains to be seen.

Finally, it should be added, that that there is another carnation disease, a destructive *blight*, that should not be confounded with this carnation rust.

DAMPING OFF.

Damping off is a disease wide spread, well known, and very destructive. The organisms causing the disease, however, have not, as yet, been sufficiently studied. So far as I know they have in this country, received no special attention.

The species belonging to the genus *Pythium*, have been studied by European botanists, and some of the forms are concerned in the "damping off" disease. This fungus is closely allied to *Peronaspora*—for examples, the grape mildew, the potato-rot, &c. The minute hyphal threads, or *mycelium*, of the fungus penetrate the cuttings and multiply or branch abundantly in the part near or at the surface of the sand or soil. From these vegetative hyphæ, proceed spore-bearing hyphæ extending outward from the epidermis, and on which the conidia, or non-sexual spores, are borne. These spores quickly germinate by the production of numerous zoospores, which in turn give rise to the vegetative hyphæ. Besides these reproductive organs, there are also sexual spores produced as in the common mildews. They are formed within the tissue of the host plant, and are called resting spores. These tide over the species in untoward circumstances and unfavorable environment, doubtless retaining their vitality for a considerable length of time. In regard to one species [*P. De Baryanum*], De Bary says:

This *Pythium* is, as Hesse has shown, a dangerous parasite. It is disseminated in garden soil to a remarkable degree. Therefore, one may be easily convinced that it almost always seizes upon plants subject to its attacks when they are sown in such earth and kept wet. One can be quite sure of obtaining the fungus by this means for examination at any time. The fungus may, perhaps, lie dormant in the earth in the form of *mycelium*, which it does at any rate, in the form of resting conidia and oospores which may retain their vitality through months of dryness. From the plant first attacked the *mycelium* spreads over the moist earth and then attacks the neighboring stock. The injury and death of seedling phenogamous plants sown in wet places have in this, as Hesse has shown, almost always their immediate cause."

Pythium omnivora has been identified by Dr. Farlow as at least one of the agents causing "damping-off," at Jamaica Plain, near Boston. It is probable that several species of fungi are more or less concerned in producing the disease.

It sometimes occurs, according to Professor L. H. Bailey, in the nursery row, but usually in plants under glass, especially when crowded.

Plants that are attacked can seldom be saved. By changing to clean sand, thoroughly ventilating, avoiding too high temperature, and admitting as much sunlight as possible, the disease can usually be checked.

Mr. Green inquired whether spraying with bordeaux mixture would prove beneficial. Prof. Kellerman replied that so far as he was informed the only remedy was to sacrifice the infested crop, and in reply to a further question as to the earth in which the diseased plants had been growing, he said it should also be thrown away and not used until the danger of infection from it had passed. The usefulness of sterilizing the soil by heat was not rated high.

Mr. Turner said that when the fungus of damping off appears in the greenhouse, dry sand may be sprinkled on diseased portions of the benches. Stirring the earth and ventilating are also efficacious.

Mr. Werner stated that he had had some experience with the practical side of the question, and when the fungus begins to appear the house should be ventilated thoroughly—it is often better in the beginning to take up all diseased cuttings and adjoining ones in danger of being affected and to replace the portion removed with clean, dry, sharp sand. Instead of the dry sand, sulphur may be used to surround the affected part. A supply of clean, dry sand is essential in managing this disease and the lack of such at the University greenhouse prevented successful treatment.

THE PLANTING OF MELON AND OTHER VINES.

BY R. J. TUSSING.

To succeed in growing melons and other vines, one must first have a good rich soil well underdrained, pure seed, and a determination to defeat the cucumber beetles.

To grow vines I would prefer a black sandy loam which has been in blue grass sod for several years, but have succeeded quite well on clover sod, or even with ground that was in wheat the previous year.

Break the ground as early in the spring as possible if it is sod, or it would still be better to plow it late in the fall. About the 25th of April prepare the ground for planting by harrowing well. Do not stop harrowing until you have it in excellent condition; mark out both ways with a single shovel making the hills 4 feet apart each way for cucumbers, and 6 feet for nutmeg melons. Drop a small handfull of superphosphate in each hill, take a hoe and work the fertilizer thoroughly through the soil, making a hill about 15 inches in diameter and about two inches above the level of the ground.

In a week or ten days, if the weather is warm, rake the top of the hill off, and if the ground has become packed by rain, take a garden hook and loosen the hill up thoroughly and it is ready to be planted.

Put from 6 to 8 seeds in a hill, plant them about two inches deep and then press the soil firmly over the seed with the foot. Just before the plants make their appearance, rake the crust off the hills. This will kill most of the weeds, if any, and assist the vines to get through the soil.

As soon as the plants begin to appear, keep a close watch for the cucumber beetles, and if they make their appearance, which they surely will, dust the vines thoroughly with old slaked lime scented with coal oil. Go over the patch once or twice a day and wherever you see a bug kill it, or give it a dose of lime. It will also be necessary to go over the patch and lime after a rain, but be sure that the lime is old or it will injure the plants.

We have tried almost all of the remedies we ever heard of and can truly say this is the best remedy, unless one protects the vines by a cover.

We have fenced the insects out the last three years and can safely say it is the cheapest in the long run, and the safest. It not only keeps the bugs out but will assist in keeping the cut worms from the hills. By using a cover you can plant a week or ten days earlier, as the cover will protect the vines from frost.

We take common fencing boards and have them resawed, which will make the boards ½ inch thick and 6 inches wide. Saw two pieces of the boards one foot in length, making the sides of the box. The cheapest grade of plant bed cloth cut 12 inches wide and 24 inches long tacked on the ends and top of the two boards completes a box with the ends and top covered with cloth. To make the box stand, we use plastering lath sawed 8 inches in length, sharpened at one end; one fastened on each side of the box and thrust firmly into the ground will hold it in place. To cover a hill spread the box apart and stick the lath in the ground, pull a little soil up to the ends, and the job is completed. The sides should be set north and south to admit sunlight. The advantage of this box is the way it can be folded and stored away for another year. If stored as soon as one has finished using them the boxes will last three or four years. In making boxes, do not use heavier cloth than the cheapest grade, as the heavier grades shade the vines too much. We have put the boxes over the hills immediately after planting, but after three years trial would advise not to cover until the vines are coming through the soil.

By using covers you will not be required to fight bugs every day, and in case of dashing rains they will protect the vines, and when the soil dries off there will be no hard crust around the vines.

When you wish to stir the soil around the hill, you need not take the box off the hill, but lift up one side and stir the soil, after which you can replace it readily.

As you probably noticed I advised to plant only 6 or 8 seeds in a hill. I am not a believer in thick planting, especially if you know your seed is good, for the more stalks in a hill the harder it will be to keep the bugs from them, and the vines are likely to become spindling. As soon as the vines get their rough or 4th leaf, thin the hills down to three stalks, which is plenty in a hill.

You are no doubt expecting me to say something on forcing vines in the green house, and transplanting them in the open ground. Will say that my experience in that line is somewhat limited, as I have tried it but one year. Last spring, about the middle of April, we took 200 quart berry boxes and filled them about one-half full of soil that we used in the green house all winter. We then planted four nutmeg melon seeds in each box, filled the box even full with soil, and then put them on the side benches in the green house leaving about two inches of soil on the benches. We kept them well watered, the seed came up nicely, and the vines did well. We planted them out in the field the thirteenth of May. We undertook to plant the vines by taking soil from the boxes, but found we could not do this without disturbing the roots too much. We then broke the corners off the boxes and planted the box and all in the hill, using a pint of water to each hill, as the ground was very dry when we planted them. As soon as they were planted, we covered them with the plant protectors and the vines never wilted. I had the hills made several days before they were planted, with a handful of superphosphate to each hill.

The frost of May 17th injured them considerably but out of the 200 hills I do not think there were ten hills entirely killed. The plant protectors saved them, for vines that had been planted in the field, and not covered, were all killed. I began gathering melons from those hills at least ten days before I did from those planted in the open ground. I do not think they yielded quite as well as the others, but the difference in the price more than paid me for my trouble.

PLANTING ONIONS, POTATOES AND ROOT CROPS.

BY E. C. GREEN.

To say anything new on this subject would be hard indeed, but there are many things about it that are necessary to success and as Mr. Terry has said, it is well to repeat a necessary thing over and over again, and then rub it in by repeating it a few times more.

To forget a thing is an easy matter and what was learned last year will be more easily remembered if we hear it again this year.

The planting out of the crops that I have to speak of to-day as well as others, can be outlined as follows:

1st, Time of planting,
2d, The preparation of soil,
3d, Depth, width of rows, &c.

The time of planting onion seed may be told with one word —early, and the earlier the better if other conditions are all right.

It is not going to hurt anything if there comes a frost or even a slight freeze, or a snow storm after the onion seed is up. The plants will stand this kind of weather better than they will the hot, dry weather of August. As soon as hot weather comes on they will ripen up and be large or small according to the amount of growth they have made before this time. I have seen onions planted in March at this place, also, one hundred miles north of here, and they made a good crop; I would not expect much of a crop if planted in May. So when I say that April would be a proper time as a general rule it would not be much out of the way.

The preparation of the soil is another important matter. No one who has had much to do with raising onions, but will remember that the soil should be thoroughly manured. This manuring should be done in the fall whenever possible, and the ground plowed late in the fall. Fall plowing will make it possible for the soil to be worked much earlier than could be done otherwise. Spring plowing is not a good thing for onion growing. The manure put on the ground in the spring should be fine and well rotted; putting on a heavy coat of manure just before working the soil or during the winter, would act as a mulch and do much to delay early planting. After the ground is well-manured it should be thoroughly pulverized on the surface, a deep stirring of the soil is not necessary.

The depth of planting is usually from one-half to one inch, and the width of row varies from one to one and a half feet. Thorough firming of the soil over the seed is necessary to quick and even germination; I have never found a better way of doing this than by walking directly on the row stepping as close together as possible.

The planting of onion sets is another way of raising onions. What I have said of time and preparation of soil for the seed will apply here and even the tramping with the feet may do more good than harm, but the depth of planting should be greater.

Transplanting onions that have been grown from the seed, is still another way of growing them. It has been given much attention by the Station in the past two or three years.

This method consists in starting the seed in the hot bed or greenhouse and putting the plants out of doors when the weather becomes suitable. The indications are that the earlier they are planted in the house the better.

The time of planting out of doors should be rather later than of planting seed as the young plants are tender after coming out of shelter. The preparation of the soil should be the same as for seed. The distance apart in row should be from three to four inches according to the kinds. We make the rows about one foot apart and put the plant in to the depth of about one inch.

Strange to say, this method of raising onions has been known for years, but it is not until lately that its advantages have been known, and now it is being practiced by many with great success.

I have extended the onion part of my subject so much that I will have to drop the rest with but a few words.

It would not take long to write out what I know and perhaps what I don't know about planting potatoes, but I think a more profitable plan for those who are interested in this subject is to get T. B. Terry's, " A B C of Potato Culture " and read the first six chapters. They will find there the best thought on the subject.

The planting of other root crops such as beets, turnips, parsnips and carrots requires special directions which I have not time to give.

VARIETIES OF FRUITS FOR FRANKLIN COUNTY.

BY O. W. ALDRICH.

At the request of the Secretary I have endeavored to give a list of fruits suitable for this county. As there is much diversity of soil in the county, I have requested him to obtain lists from other members of the society, and I give those of apples as furnished by other members.

Colonel G. S. Innis, living south of Columbus, gives the following list of 100 trees.

LIST OF 100 TREES FOR AN APPLE ORCHARD.

SUMMER.

5 Early Harvest.—July.
5 Red Astrachan.—August.
2 Jaeger's 4th of July.

FALL OR AUTUMN.

5 Belmont, or Gate.—Oct. 1.
3 Summer Pearmain.—Sept.
3 Fall Pippin.—Nov.
2 Tallman Sweet.—Sept.

WINTER.

10 Yellow Bellefleur.—Dec.
10 Northern Spy.—Jan.
5 Rhode Island Greening.—Jan.
5 Baldwin.—Feb.-March.
5 Newtown Pippin.—March.
5 Westfield Seek-no-farther.
5 Smith's Cider.—Jan.
8 Canada Red.—Jan.-Feb.
5 Hubbardston's Nonsuch.—Feb.
5 Esopus Spitzenburg.—March.
5 Pennsylvania Rambo—Jan.-Feb.
5 Roxbury Russet.—March.
2 Paradise Sweet.—April.

Mr. H. W. Phelps, of Westerville, sends lists as follows: Large Rambo, Small Rambo, Fameuse, Gilliflower, all good bearers on their clay soil, but not good keepers. Seek-no-farther and Baldwin do not do well. Harrison is a good bearer, fine for cider and vinegar; Damson and Wild Goose plums bear well.

Mr. H. C. Hart, of Central College, gives following list for clay land: Ohio Nonpareil, Early Joe, Summer Queen, for summer; Pickering Rambo, and Fall Pippin for fall; Limber Limb Pippin, and for very long keeper, Rock Rimmin, a great bearer, but small and not desirable.

Considers Early Rareripe the surest bearing peach.

For an orchard in the north and northwest part of the county, would plant the following, ripening in succession:

Early Harvest,
Red Astrachan,
Benoni,
Maiden's Blush,
Rambo,
Fameuse, or Snow,
Hubbardston's Nonsuch,
Grimes' Golden,
Seeknofarther,
Dominie.

For market and home use, the Northern Spy is very profitable in the northeastern part of Clinton township, but not so good farther west.

Ben Davis and Smith's Cider are amomg the most profitable for market, as they are productive, hang on the tree and are very attractive.

Pears—Tyson, good bearer on old trees, excellent quality, Bartlett.

Buffum, good bearer, not very good quality on young trees, but very good when the trees get age, and quite salable.

Flemish Beauty, hardy and productive, good quality, but liable to scab and crack in some localities.

Seckel, tree healthy, productive, fruit small, but of best quality.

Sheldon, good bearer, of good quality, but needs spraying to prevent wormy fruit.

Anjou, a very good early winter pear, of large size.

Lawrence, one of the best of the early winter pears, ripening without difficulty.

Dwarfs—Angouleme, a large pear, of good quality, and generally productive, fruit buds a little tender.

Vicar of Wakefield, a large, productive, winter pear, valuable for cooking. Tree rather subject to blight.

Of the newer varieties, would try Wilder, a new early pear, of vigorous growth, productive, and said to be of the best quality; fruit small to medium, but attractive in appearance.

Idaho, a very large late fall pear from Idaho, of good quality.

Lincoln, from Illinois; tree vigorous, healthy, productive; fruit medium to large, fine quality and beautiful.

Vermont Beauty, a beautiful red-cheeked pear, ripening in October, excellent quality and productive.

CHERRIES—Sour—Dyehouse, Early Richmond, Montmorency, ordinary and English Morello, ripening in succession, all good bearers and hardy.

PLUMS—For canning—Damson, Robinson.

For table or market—Bradshaw, Lombard, German Prune, Bavay's Gage.

Would try Saratoga, Lincoln and Grand Duke of the newer varieties.

GOOSEBERRIES—Houghton, Downing, Champion.

CURRANTS—Red Dutch, Victoria.

RASPBERRIES—Red—Turner, Shafer's Colossal.

Black—Palmer's, Ohio, Gregg.

BLACKBERRIES—Minnewaski, Snyder, Erie.

STRAWBERRIES—Crescent, Bubach, Haverland, with May King, Pearl and Enhance for fertilizers.

Parker Earle and Beder Wood are very promising new varieties.

NEW VARIETIES OF FRUIT.

BY O. W. ALDRICH.

I have found descriptions of the following new varieties of fruit which appear to be worthy of mention.

APPLES.

Hennepin—I have received scions of this variety from Mr. A. H. Gaston, of Locon, Ill., who described it as a valuable winter variety, very hardy and productive. A seedling of Yellow Bellflower, supposed to have been pollenized from Ben Davis.

Currant Crab—I have also received scions of this new fruit from Mr. Gaston. It is said to be a very beautiful flowering tree, bearing a great quantity of fruit about the size of a large currant, the tree being like a crab apple, and the scions uniting with the apple or crab. The fruit is said to be an excellent substitute for the cranberry when fresh, and when dried it has a flavor somewhat like the zante currant. There are no trees yet for sale.

CHERRIES.

Improved Dwarf Rocky Mountain—I have received for trial plants of this variety from Mr. Charles E. Pennock, of Bellevue, Colorado, who describes it as a bush growing about four feet high; fruit ripening in September. The species is very rare in Colorado, and a valuable fruit there. A photograph received shows the bush loaded with fruit as large as the ordinary cherries.

Toronto—This new Canadian sweet cherry is now offered by the Heikes Nurseries Co., of Dayton, Ohio.

Temple—A Duke cherry, ripening about June 10th. Large size, sub-acid flavor, strong upright grower. Offered by The Albaugh Nursery and Orchard Co., of Dayton, Ohio.

Seederberger—A new sweet cherry, offered by the same firm. Resembling Yellow Spanish, but larger and more vigorous. Brought from Virginia.

GOOSEBERRIES.

Newell—I have received two plants of this new variety for trial from Mr. A. H. Gaston, of Locon, Ill.

Columbus—Elwanger & Barry, of Rochester, New York, are offering a new American seedling, of large size, oval in form, skin greenish yellow, smooth, of fine quality. Plant, a strong grower, with large thorns. Foliage, large and free from mildew.

GRAPES.

Early Ohio—Originated on the grounds of Mr. Hunt, of Euclid, Ohio; said to be one or two weeks earlier than Moore's Early; nearly as hardy and vigorous as Concord, and very productive. Bunch compact, berry black, below medium in size, pulp soft and quality good.

PLUMS.

I have received from Augustine & Co., of Normal, Illinois, trees of the Odell and of the Elwood plum, which they are introducing. I think, from the looks of the trees, that they are of the European class; but have not received any description.

H. E. Rowley, of Locon, Ill., is said to have a number of varieties of a dwarf Sand plum, growing only six to eight feet in heghth. They can be planted as close as three feet by six, and are of good size, and are superior in quality to most of our native varieties. They were originally procured from Kansas.

PEACHES.

New Prolific—A new peach from Michigan, said to be of large size, fine flavor, very productive, and very hardy. Flesh firm, making it an excellent shipper.

Minnie—From Louisiana, a large freestone, beautiful, sweet, and highly flavored, a half blood Indian peach like Elbuda, ripens middle of July at place of origin.

Adrian—From same locality. Tree vigorous and hardy, and a prolific bearer of large freestone fruit of most beautiful appearance, yellow flesh of fine flavor, ripening in Louisiana July 25th.

Williamson's Choice—From New Jersey. A little smaller than Crawford, but remarkable for regular, abundant, amount bearing, flesh yellow, firm of excellent high flavor.

PEARS.

Bartlett-Seckel—A new pear originated by Jacob Moon, who originated Brighton and Diamond grapes, from seed of Bartlett crossed with Seckel, of splendid quality and good size. Offered by Elwanger & Barry, and Green Nursery Co., of Rochester, N. Y.

I have received for trial, scions of the Gans, from George W. Trowbridge, of Crestview, Ohio. Hebe from Dr. L. M. Ayers, of Urbana, Ohio; Arkansas Mammoth, from Judge Samuel Miller, of Bluffton, Mo., and of Lincoln from F. S. Phœnix, of Bloomington, Ills.

STRAWBERRIES.

Standard—A berry from Massachusettes. Plant, a free grower, healthy and vigorous, berries large bright crimson, fine, rich and sprightly, season medium to late.

New Wonder—Originated by J. B. Alexander, of Hartford City, Indiana. Said to be an ever-bearing variety, bearing continuously from May to October, large and finely flavored berries.

E. P. Roe—A very late berry, from Newburgh, N. Y., beginning to fruit there, June 29, and continuing till July 11. Plants are said to be firm, vigorous, and free from rust, with perfect flowering blossom, and very productive, berry resembling the old Kentucky in appearance, is said to be of the best quality.

Southard—Originated in southwestern Ohio. Said to be productive as the Crescent, and as large as the Sharpless, and extra early in ripening. Blossoms perfect.

General Putnam—A berry which originated on the old farm of Israel Putnam, at Brooklyn Connecticut. Supposed to be a seedling of Cumberland Triumph which the fruit resembles, but the blossom is imperfect and plant far more productive than its parent, ripening in mid season.

Swindle—From seed of Jersey Queen, fertilized by Glendale, and somewhat resembling the latter in habit of growth, blossoms imperfect, fruit ripens very late, is always large, to very large firm and solid, sprightly high flavor and rather acid, as late as Gandy and fully four times as productive.

Oliver—A seedling grown by Phil Strubler, of Naperville, Illinois, resembling Miner but more acid, very firm, and one of the latest, a perfect flowering variety.

Leader—A very early and large berry, of crimson color, very productive, firm, of good quality, and with perfect blossom, a good grower with healthy foliage.

Gillespie—A seedling of the Haverland, with perfect flowers, resembling its parent and even more productive, larger and best in quality.

ORNAMENTAL VINES, SHRUBS AND TREES FOR SMALL GROUNDS.

BY PROFESSOR WILLIAM R. LAZENBY.

Perhaps the greatest defect in American ornamental gardening is that the grounds are too large and not sufficiently cared for. No one should attempt to adorn and beautify more ground about his home then he can keep in the most satisfactory condition.

Perfection or excellence brings contentment and pleasure, while failure or a partial success is a source of mortification and pain.

The foundation of all modern ornamental gardening is a good lawn. This is the first requisite and must not be overlooked. But a good lawn is often spoiled by making unnecessary walks and by excessive planting of shrubs and trees. Grass will not grow well in dense shade and no lawn can look well if cut up and crossed by numerous walks. The lawn may be compared to the carpet of a well furnished room, while vines, shrubs and trees take the place of the other articles of furniture.

Among the many shrubs and trees suitable for small grounds, I would name the following as being among the most desirable for this soil and climate.

(1.) *Berberry*—Especially the purple leaved variety. This is perfectly hardy, has a neat compact habit of growth, and is well suited for massing or for ornamental hedges.

(2.) *Flowering Almond*—Two varieties, one pink and one white. Perhaps one of the most desirable of any of the early spring flowering shrubs.

(3.) *Deutzia*—These are among the very best shrubs for general use. The dwarf variety *gracilis* is perhaps the best for small grounds. It blossoms in early June and bears a profusion of white flowers.

(4.) *Golden Bell*, or *Forsythia*—The bright, yellow flowers of these shrubs are among the first to appear in early spring.

(5.) *Hibiscus* or *Althæas*.—These are not planted as largely as their merit will warrant. We have in the different varieties a wide range of color, and when well selected, their flowers afford the chief attraction in many grounds during August and September.

(6.) *Honeysuckles*.—The upright growing or bush honeysuckles are old time favorites in gardens. Many of the varieties are well shaped symmetrical shrubs bearing an abundance of white or pink flowers. Of the many varieties the Tartarian and large flowered (*grandiflora*), are probably the best.

(7.) *Hydrangeas*.—Of these there are perhaps half a dozen varieties in cultivation. The most desirable is the *Paniculata grandiflora* which bears large heads of white flowers. Perhaps there is no shrub that makes a more attractive, or magnificent appearance during the summer. This shrub should be carefully and quite severely pruned each season as the flowers are borne upon wood of the same seasons growth.

(8.) *The Lilacs*.—These are too well known and too highly appreciated to need either introduction or recommendation. The numerous varieties now in cultivation present three distinct types. Of these the old fashioned lilac familiar to all is perhaps the most desirable, although some of the newer varieties are well worthy of a trial.

(9.) *Spiræas*.—Here we have a still larger list than we found in the lilacs—but there is scarcely one among the whole number that is not worthy of cultivation. A group of spiræas composed of the best of the different varieties has a very striking effect, but such massing is hardly possible on small grounds.

(10.) *Syringa* or *Mock Orange.*—These are well known and widely appreciated shrubs. Rather too large and vigorous growing for very small grounds, yet desirable on account of their sweet scented white flowers. The variety known as *Coronarius* is the most fragrant.

(11.) *Snowball* or *Viburnum.*—These shrubs possess many desirable qualities. Probably the best all around species in cultivation to-day is the Japan Snowball or *Vibnrnum Plicatum.* This should be given a sheltered position.

(12.) *Weigelias.*—These are well known standard ornamental shrubs. of several varieties, ranging from white to crimson. The rose colored are perhaps the most showy when in bloom.

This short list by no means exhausts all the desirable shrubs, but judging from my own observation and experience it contains those most likely to give the greatest satisfaction, because they have the highest average, or largest sum total of the essential characters of a good ornamental plant.

ROSES.

(Hardy Hybrid Perpetuals.)

(1.) Anne De Diesback.
(2.) Gen. Jacqueminot.
(3.) Marshall P. Wilder.
(4.) Ulrich Brunner.
(5.) Paul Neyron.
(6.) Madame Charles Wood.

LIST OF CLIMBING VINES.

Japan Ivy.
Akebia.
Clematis, (*Jackmanii.*)
Wistaria.
Honeysuckle, (monthly fragrant, scarlet trumpet.)

LIST OF SMALL DECIDUOUS TREES.

Beech, (purple leaved.)
Flowering Dogwood, (both white and purple flowers.)
Horse Chestnut, (red and white flowering.)
Judas Tree or Red Bud.
Sweet Gum or Liquid Amber.
Maple, (Wier's cut leaved.)
Maiden-hair or Gingko tree.

LIST OF WEEPING OR DROOPING TREES.

Cut-leaved weeping Birch.
Camperdorn Elm.
Weeping Mountain Ash.
Kilmarnock Willow.
New American weeping Willow.

REPORT OF THE FRUIT COMMITTEE FOR FEBRUARY.

O. W. ALDRICH, CHAIRMAN.

The season is not sufficiently advanced to enable one to determine how the various fruits have stood the winter, but I have noticed some of the trees and plants, and I find that peach buds are seriously injured. Whether they are all killed can not yet be determined.

The Japanese Wineberry sent out two years ago as perfectly hardy, is very tender, all my plants being killed to the ground.

I notice that Gainor, Erie, Minnewoski, Eldorado, Governor, and Holt blackberries do not yet show any signs of injury.

I have received scions of Arkansas mammoth pear from Judge Miller, of Missouri, Lincoln pear from T. S. Phœnix, of Bloomington, Illinois, and Hebe pear from L. M. Ayres, of Osborn, Ohio, for testing.

REPORT OF COMMITTEE ON ENTOMOLOGY.—JANUARY.

BY PROF. F. M. WEBSTER, CHAIRMAN.

Among the matters of especial interest to Ohio Horticulturists at the present time, is the advance westward of the Pear Midge, *Diplosis pyrivora*, an insect closely akin to the wheat midge, *Diplosis tritici*. The pest was first reportsd near Meridan, Conn., in 1881, and was there confined almost entirely to the large fruit farm of Messrs. Coe Bros. In 1884 this firm appealed to the Department of Agriculture for aid. An agent of the Division of Entomology was detailed to work up the matter, and a report is included in that of the U. S. Entomologist for the year 1884. Believing the pest to be an imported one, and its area in the country limited to the locality mentioned, Prof. Riley brought the subject before the meeting of the Mississippi Valley Horticultural Society, at New Orleans, urging that some decisive measures be taken to stamp it out, and he again expressed his concern, and advocated prompt and decisive measures in his report as U. S. Entomologist for the year 1884. No attention was paid to the matter, however, and the subject was dropped. The pest has of late been heard from but rarely, and entomologists had begun to think it would not prove as destructive as at first supposed, especially as it was not known to be spreading. Last season Prof. Lintner, State Entomologist, of New York, reported the pest as doing serious injury at Catskill, Greene County, and also found it in Albany, New York. With this long and sudden stride westward, it is impossible to say where they may not appear next.

The eggs are deposited, in spring, in the flower end of the fruit as soon, or even before it "sets." The larvæ, from 15 to 35 in number, as Prof. Lintner states, eat into and destroy the core, 90 per cent. of the fruit of one inspected tree being thus affected. The Lawrence pear is especially subject to attack. No remedy is known, and seemingly the only measure which promises future relief is to kill all of the pear bloom in infested localities.

The Stalk borer or Heart worm, *Gortyna nitela**, has been reported as injuring twigs of peach in Ohio. The pest is well known and attacks a multitude of plants, especially corn, potatoes, dahlias and other succulent plants. The same publication, p. 135, records the attack of *Systena frontalis*, on the leaves of pear, in New York. A similar species, *S. blanda*, attacks corn, potatoes, beets and other vegetables, but we believe this the first time that the former species has been known to depredate on useful plants. It is abundant in Ohio.

Early in the present winter the lettuce plants, in the Experiment Station greenhouses were attacked by small, green worms, in numbers sufficient to do serious injury. The same thing was received from Mr. R. H. Warder, of North Bend, Ohio, with the complaint that they were destroying lettuce plants in his cold frames. We have just reared adults of the depredator, and find it to be the Cabbage Plusia, *Plusia brassicæ*. Some years ago a florist of a neighborsng State complained to us of a similar worm destroying the flowers and foliage of geraniums in his greenhouse. In this case the larvæ were determined for us by Prof. Riley, as those of *Heliothis umbrosa*, a near relative of the Boll worm.

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*Insect Life, Vol. 4, p. 140.

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PROCEEDINGS OF THE SOCIETY.

APRIL.

The Society met at the Experiment Station, April 30th, at the usual time.

Mead Wilcox was elected to membership.

The committee appointed to prepare a memorial of the late F. C. Sessions, presented a report which was unanimously adopted and its provisions ordered carried out.

Mr. Selby of the Committee on Botany spoke briefly of the rate of plant introduction into Franklin county. Starting with 1850 it amounts to about nine per cent. of the total number of plants now present. That is, about that percentage of them have come in during the period named. He expressed the opinion that the number of introduced species will continue to increase.

Prof. Kellerman said that the Aecidia and Peronosporæ are very late in appearing—much later than expected. The powdery mildews have not yet put in their appearance.

Mr. Werner exhibits a fine flowering plant of *Amaryllis vitatum*. He stated that a friend who had kept it four years had tired of it since it had not blossomed; he had kept it two years since then. Mr. Werner was of the opinion that it would now blossom every year.

Specimens of wild poppy, *Stylophorum diphyllum* were also shown. These were from plants transplanted to grounds by University greenhouse. Mr. Selby spoke of the abundance of the wild poppy near Edward's Station along Big Walnut.

The following program was then carried out:

The Use of Hardy Herbaceous Plants in Ornamental Gardening, Wm. C. Werner.

Pruning Tomatoes, W. S. Turner.

Recent Discussions on Forestry, Jno. J. Janney.

Each paper was followed by an animated discussion.

A bill of Gazette Printing House for $113.25. One of Secretary for postage, $3.00, and one of Rural Publishing Co. for Bailey's Annals of Horticulture, $1.78, were allowed and ordered paid.

There being no further business the Society then adjourned.

MAY.

The Society met in one of the Academy buildings at Central College, Saturday, May 28, 1892, and was greeted by a goodly assemblage of the citizens of the community.

Mr. Selby of the Committee on Botany, Prof. Kellerman on Vegetable Pathology and Prof. Webster on Entomology, presented reports which will be found in the proper place.

Prof. Lazenby presented an interesting report on Meteorology, showing that the temperature of May 59°, has been 3° less than normal and that though rain has fallen on twenty days the amount is only 4½ inches, less than the average rainfall for the last 12 years.

The regular paper on Soil Tillage was read by Prof. T. F. Hunt.

After a spirited discussion the Society adjourned.

JUNE.

A very profitable and well-attended meeting was held in Horticultural Hall, Ohio State University, June 25th, President Wilson presiding.

Col. Innis, chairman of the committe to prepare a memorial of the late R. G. Hanford, asked for further time which was granted.

Mr. Selby, of the Committee on Botany, spoke of the Report of Missouri Botanical Garden (Shaw Garden) for 1892. These reports are received by the Society in exchange and contain each year the results of a large amount of research presented in an almost ideal manner.

The one above mentioned contains Prof. Trelease's Revision of the Genus Rumex, with illustrations and numerous plates of various species of Yucca, an extended article on "The Yucca Moth and Yucca Pollination," by Prof. C. V. Riley, with description of new species of the insect, together with a synoptical list of the Yuccas by Prof. Trelease.

Mr. Selby also reported a new weed as again collected in Columbus, after several years. It is a shade loving weed of European origin, *Galinsoga parviflora*, and was found in the alley between Hunter and Dennison Aves.

Prof. Webster submitted a report on Entomology which appears elsewhere.

Mr. Werner, of the Committee on Plants and Flowers, exhibited some handsome specimens of flowers. The number included *Gaillardia aristatu*, *Coreopsis lanceolata*, *Catalpa bignonioides*, *Centaurea Cyanis* and a cultivated Delphinium. He called attention to the presence of a Yucca, *y-filamentosa*, on the grounds just coming into flower. A new species of Carex was reported from the University farm.

President Wilson brought for identification a variety of red raspberry. It was pronounced the "Turner" by W. J. Green.

Dr. Aldrich reported prospects for large fruit not flattering. Cherries are a failure, apples likewise, pears somewhat better. Some varieties of plums are full while others have been badly injured by curculio. Lombard, Bradshaw, Purple Egg and Golden Drop were mentioned as varieties having an abundant promise.

Plum pockets on branches he reported as appearing later the present season, though coming to maturity as early as usual. He expected to observe its effects on fruit of other varieties.

Turner raspberry is quite full.

Champion Gooseberry is to be recommended.

Col. Innis thought we must get rid of curculio in order to raise plums.

Mr. Green thought this not the best county for plums; have been successful here by spraying for curculio. Not successful either by jarring on some orchards along lake shore but as successful by one method as by the other.

Two excellent papers were presented as regular program:

Strawberries at Columbus in 1892, Prof. W. J. Green.

Our Native Violets, by E. E. Bogue.

Mr. Bogue exhibited specimens of about twenty species of native violets.

A bill of 93 cents for Prof. Bailey's Annals of Horticulture 1891 was allowed and ordered paid.

After speaking of the Botanical building as the most favorable place for holding the July meeting, the Society adjourned.

AUG. D. SELBY,
Secretary.

EDITOR'S TABLE.

This is the season when everything invites away from the study and the house and 'twould hardly be the correct thing to ask the readers of the JOURNAL to do what the editor does not, so none will be invited to join him long at the "Table" page.

* * *

Since the last number, the Annals of Horticulture, by Prof. L. H. Bailey, have been purchased as there foreshadowed. The Report of the Missouri Botanical Garden for 1892 is another addition to the library; the latter is noted under proceedings for June.

* * *

Part II of Prof. Coulter's Manual of Plants of Texas has been issued by the Division of Botany, Department of Agriculture. It may be of interest to point out that one of the newly introduced plants found at Sellsville, *Helenium microcephalum* is there given for southwestern Texas and adjacent parts of Mexico; another of the newcomers *Parthenium Hysterophorus* which showed a decided weedy habit the past two years here, Dr. Havard is quoted as pronouncing "one of the commonest weeds about the streets of San Antonio."

* * *

Prof. Halsted's Check List of American weeds, from which it appears the last named plant is omitted, enumerates 751 species of flowering plants and ferns that fall under that category. A separately numbered series of 100 includes most of those of strongly marked weedy character.

* * *

With the removal of Prof. Webster to Wooster, the Society can begin to appreciate the losses it will suffer in the final removal of all members of the Station staff from the city. No doubt the Society's loss will be Wayne county's gain, but it is only necessary to recall how willingly members of the Station corps have labored for us to appreciate how much they have contributed within the past few years.

* * *

The attention of those more especially interested in agricultural topics is called to the article of Prof. Hunt, in this number, upon Soil Tillage. Why waste feed for horses on deep tillage when the results are as he states them?

* * *

Mr. Green's paper on Strawberries the present season will show those desiring to plant berries just what varieties are likely to make the best return. With such a clear statement of the case, it is poor policy for local growers to spend money in testing unknown sorts.

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Although May was a most unfavorable month for outdoor excursions, the series arranged by the Biological Club furnished one very successful outing to Georgesville, and also one to Sugar Grove. This plan is in the right direction, and should be again tried next year.

* * *

The Secretary expects not to be present at the next meeting, and may find, while away, some things of sufficient interest to report on a future occasion.

COMMUNICATIONS AND DISCUSSIONS.

THE USE OF HARDY HERBACEOUS PLANTS IN ORNAMENTAL GARDENING.

BY WM. C. WERNER.

One of the definitions of a garden is "a delightful spot." I need not say that it would be impossible for me to tell how each one here can make a "delightful spot" out of his or her garden. I would presume only to call attention to a class of plants that have been, to a large extent, neglected in ornamental gardening and to give a few hints, the observance of which it is to be hoped, will be an aid in making delightful spots out of our home surroundings. There are few places that do not present situations and opportunities for the cultivation of hardy plants.

As in everything else, in gardening we must make the most of the situation and conditions. If our surroundings are not adapted for the best development of such plants as Rhododendrons and the finer Lilies, we still have a most extensive list to select from. It is only by the aid of hardy plants that we can secure the most favorable results. This has been recognized in the free use of hardy trees and shrubs, but we cannot obtain an ideal garden without the use of hardy border plants.

We can imagine what such a garden should be, only occasionly do we see one. A flower garden in this latitude ought to give flowers for fully six months in the year.

In such a garden spring is ushered in with Crocus, Snowdrops and the delicate blue flowers of Scilla Siberica, quickly followed by fragrant Hyacinths, early Tulips, Narcissus and Pansies.

From this on there should be no gap or break whatever, the regular spring flowering plants such as Paeonias, Dicentras and Lily of the Valley would prepare us for the wealth of bloom with which our ideal garden should be aglow during June, the month of flowers.

Iris Germanica, Delphiniums,, Clematis, Foxgloves, Dictamnus, Lilies and Aquilegias are only a few of the June blooming plants that should be found in every garden of any extent. During midsummer we cannot expect such a grand floral display as in June, yet there should be no dearth of flowers, stately Hollyhocks, Gladiolus, Phlox, Double Helianthus and other summer blooming kinds would follow each other in quick succession.

We might liken such a garden to a floral calendar: nothing would be a surer indication of the approach of Autumn than the tall orange colored spikes of Tritoma and the white clusters of Anemone Japonica alba. With Chysanthemums we would practically come to the end of the floral season. If the weather is not too severe we should be able to pick Pansies until well into November. A bed of Pansies last year furnished flowers from April until the middle of November. This spring the plants again came into flower about April 15th, giving bloom for seven months in the year.

Since fashion rules in everything else it is to be expected that she dictate to us what and how to plant in beautifying our homes.

The "old style" of gardening as it is often called, was crowded out in the rage for massing and fancy bedding with tender greenhouse plants. Under this system whole beds are filled with plants of one kind, either for their flowers or foliage, or plants of strongly constrasting colors are closely planted in geometrical designs. We are to congratulate ourselves that a reaction has taken place and other more natural modes of ornamental gardening are again receiving special attention. When this bedding of greenhouse plants is made the main feature the floral season is contracted to about four months. With a judicious selection of hardy plants and bulbs we may reasonably expect flowers for over one-half of the year.

It is true that a bed of Geraniums is never without bloom from the time of planting until frost, and a carpet bed presents the same brilliant effect every day throughout the season, yet the most earnest admirers of such bedding must admit that it becomes a sort of stereotyped affair when we depend upon this sort of gardening altogether for the ornamentation of our grounds.

No true lover of flowers can get such a keen delight from this "rug pattern" and "bunching" method as when each plant is to be looked upon as an independent individual.

In short, the more extensive use of hardy plants is to be urged for the following reasons: their great variety of forms and habits of growth, their diversity of foliage, the variations of form and color of the flowers, the length of the blooming period, and last and perhaps the most important of all, for their permanence. When the plants are once established they increase in size and beauty from year to year. When the foliage and flower stems die down in the fall we know it is not the last of our plants but that they will appear again the next spring with renewed strength and vigor.

The cultivation of most hardy plants is comparatively simple. The first requisite is a good garden soil well enriched and thoroughly pulverized to at least eighteen inches in depth. Success will to a great extent depend upon the situation selected; if possible the border should not be in close proximity to large trees or large shrubs, where it can be robbed by their roots, this, however, is not always possible in small places.

During summer the ground must be frequently stirred to kill weeds as they appear and to keep the surface loose and open. It is often necessary to tie tall growing kinds to a stake; this support should be hidden as much as possible by the foliage. All old flowers should be removed as a matter of neatness and to prevent exhaustion of the plant in perfecting seeds. Whenever seeds are wanted a portion of the flower stems may be left for that purpose. Although the plants may be hardy and able to withstand our winters without protection, a mulching of some suitable material has beneficial effects; such a covering prevents the roots from heaving which is the result from alternate freezing and thawing, besides affording direct protection.

The coarser litter may be raked off in the spring and the finer manure worked in the soil with a spading fork. Planting is best done during the fall months, as then the plants form new roots and become established before winter. When set out in the spring the work should be done early, otherwise the plants are disturbed at a time when they ought to be starting into a vigorous growth. I would again suggest fall planting whenever possible.

After a number of years some of the stronger growing sorts will become so inconveniently large as to require division; as in the first planting this is best done during the fall months. Plants having underground stems of the character of Iris Germanica, Helianthus or Lily of the Valley may be readily pulled apart or the mass cut through with a spade. Such plants as Paeonias, Funkias and Dicentras had better be left undisturbed so long as they do not encroach on one another.

If for any reason division is thought advisable it should be carefully done with a strong knife. Such divisions and offsets we can of course give to our neighbors and add to their enjoyments.

In setting out, the height and habit of a plant should always govern the position it is to occupy in the border. At the end of the season it may be thought best to change the arrangement of some of the plants for better effect; if carefully done this need not in any way be detrimental to them. As a general rule the taller plants should be set back from the edge of the bed, but never should the arrangement be of that formal style in which the smaller plants are all placed near the margin gradually sloping up to the taller ones at the back; neither is it advisable to place the same kind of plants at regular intervals along the bed. They should rather be planted in one or more groups; though some strong characteristic plants may here and there be planted toward or even at the very edge. Groupings of low plants may at times extend nearly to the back of the border thus giving the whole a more varied appearance. We should however at all times guard against the "hit and miss" manner of planting that we too often see, which is as bad if not worse than the regular and formal mode just mentioned.

The limitations of one paper must preclude the possibility of bringing forward all the use that hardy plants can be put to in varied situations. I would merely refer to two features. The use of strong growing hardy plants in connection with Cannas, Caladiums, etc., for sub-tropical effects, and the bringing of native plants into cultivation. The latter cannot help but be a source of pleasure to all lovers of plants. These two features would make good subjects for separate papers.

In conclusion I would say that I do not advocate the planting of hardy plants to the exclusion of greenhouse bedding material, but urge the more extended use of this class of plants. To the reasons already given might be added that of economy.

It certainly meets the wants of those in moderate circumstances better than any other kind of flower gardening. There is little expense beyond the original cost and the investment never fails to yield an annual dividend of beauty and loveliness

If I were to be deprived of either the regular greenhouse bedding material or hardy plants, I should most certainly let the former go and hold fast to those of permanent good, and have flowers not only during the whole summer and autum but also during early spring, the fairest season of the year. If we were to go to one or the other extreme such a course would be more wholly satisfactory than when all of our energy and skill is expended in annual floral pyrotechnics.

TOMATO PRUNING.

BY W. S. TURNER.

The fruit of the *Lycopersicum* has become so popular as to be almost as much of a standard as peaches or apples; and it can now be had in most of our cities throughout the year, besides the great amount of canned ones that are used. The demand seems to be increasing, especially as an early summer crop in forcing houses.

To do this, it becomes necessary to grow the plants near together, so as to secure a larger yield to the square foot than could be secured in the field. Hence the necessity of pruning.

To prune successfully, something should be known of the manner of growth of the tomato plant. When the plant is old enough to throw out blossom stalks, it always sends out a branch in the angle of the leaf, just below the blossom stalk; sometimes branches start out in the angle of nearly all the leaves below. These are the ones to be pinched off; this must be done all through the season, or until they have grown to the required height. Then the end may be pinched off, and the plant kept at the same size until all the fruit has ripened. This may be done when the plant has but one or two blossom stalks, if it is so desired. By so doing earlier fruit may be had than by any other means. The plants may be crowded closer together: one square foot would be sufficient for a plant —ours in the house are eighteen inches apart—set alternately, so as to give the plants more leaf room, as the leaves of the plant are very much larger when the branches are pruned off than they are ordinarily. If you wish to secure large, fine fruit, the blossom stalks may be pinched off at the end, leaving only two or three tomatoes that come out next to the stem of the plant, and are always the largest. Thus, by pruning, fruit may be secured earlier by two weeks; also, larger, finer fruit may be grown. Last season we raised, by pruning, some of the finest Acme tomatoes that were ever seen out of doors. The Acmes are, ordinarily, small and early. The fruit may be somewhat more inclined to crack than ordinarily.

But the labor of pruning is considerable, and the expense of supporting is something; yet, when they are forced in fruit houses, so as to come in May or June, the labor is well repaid, as fifty cents to one dollar per plant are in the possibilities. From three to eight pounds is the range of the product, and prices from ten to twenty-five cents per pound.

To procure suitable supports, for the house as well as out of doors, is quite a matter of consideration I think reeds might be procured, like fish poles, at but moderate cost. These could be secured at the top by stretching a wire at the required height and tying the reeds to it; this could be done in and out of doors, and would look very well. We intend to get wire netting with as large meshes as we can and stretch that along the row for out door support.

It was thought that for outdoor culture 4½ feet would be sufficient for height of supports.

Prof. Kellerman suggested that tillage among pruned ones would be easier than among unpruned.

Mr. Turner stated that there is an advantage in spraying. Dwarf Champion is the best variety for this sort of growing, and 18 inches by three feet is enough room for plants; since by ordinary planting they are set 4 feet by 4 feet, there is a large gain in the number of plants per area. Pruning and tying should be done once a week. That unpruned plants out of doors last year gave 20 per cent. more for the same number of plants and 40 per cent. less for the same area than the pruned ones.

By using wire netting of very coarse meshes, this year, we hope to weave the vines in and out of the meshes, and to save tying.

Mr. Werner said he had experimented somewhat with pruned tomatoes; finally used stakes at the ends of rows, or as required, and stretched wires, or slats, between. It is well to trim out a leaf now and then. He found the Mayflower the best tomato for home use.

Mr. Turner said Livingston's Perfection, Dwarf Champion, and Acme are all fine. I have noticed that the tomatoes from Florida this year are far superior to previous seasons, owing to the fact that Livingston has been selling them seeds.

As to comparative profit in greenhouse, tomatoes can be very well grown alternating with lettuce. A gardener—Mr. Johnson—who has been growing three crops of lettuce, now grows one crop of tomatoes and two crops of lettuce; in this there is a gain, as one crop of tomatoes pays as well as two crops of lettuce.

SOME NOTES ON FORESTRY.

BY J. J. JANNEY.

The following notes upon the preservation and cultivation of forests have been gleaned mainly from late numbers of *Garden and Forest.*

The spirit of the American people from the settlement at Plymouth and Jamestown, is fully illustrated by this modern instance, given by Charles H. Shinn, in a recent letter. One San Francisco firm owns thirty thousand acres of pine land in the Mt. Shasta region, Shasta county, California, to which a thirty mile flume is to built connecting the tract with a railroad. A mill owner said, "when we have cut it all off, we will go to Alaska."

"But the people want these forests left."

"The people don't care. Every settler within ten miles of my mill wants to sell me trees at a dollar apiece. The State doesn't care, or it would have been saved, at least the school sections. The country doesn't care, or we should hear from it. There is money in the lumber business and every tree has to go. Sorry for the feelings of the fellows who didn't know enough to get timber land when it was cheap."

Or, take another illustration of public sentiment. John R. Hite and J. W. Snyder had been cutting timber from the public land ten years, June 1877 to 1887. The government agents estimate the timber cut at $91,000, and a jury of their peers, that palladium of American Liberty, gave a verdict of $5,000. There seems to exist a sort of public sentiment that every man has a right to his share of public property, if he can lay his hands on it; and not knowing exactly what his share is, he always aims to take enough to cover all contingencies.

Not only the public, but the private forests as well, have been destroyed with reckless extravagance. The writer had a friend in Warren county, who owned about two hundred acres of the best land in the county, with a fair portion of good timber, situated just right for a northwest wind break for his buildings; but he thought he could cultivate it and buy all the wood and timber he needed and have a neat profit left, and now all the trees on the farm, including fruit trees, would not make a quarter of an acre of timber.

There is at least one notable instance in opposition to this barbarism. In 1681, William Penn issued an order requiring the reservation of " one acre of trees to every five acres that were cleared." If the governments of the colonies and the States had all been possessed of the wisdom of the sedate Quaker, we would not now be required to strive for the preservation or restoration of our forests.

There is one line of action on which the American people seem to have acted with steadiness of purpose; the destruction of the forests, the extermination of the Indian, and with him, the Buffalo; and now, when success seems to be just in the advance, they seem to be awakening to the fact that they have been acting unwisely and very much against their own interests.

As long ago as 1817, an act was passed reserving lands producing Live Oak and Red Cedar for ship building, mainly found in Florida. Timber thieves paid but little or no attention to the law. Like all other thieves, they fear only the sheriff and the marshall.

A correspondent of *Garden and Forest* writes that " all the high Sierras about the Yosemite must be reserved soon, or the timber will be ruined. As it is the timber is becoming so thin on these high plateaus about the Yosemite, that snow melts rapidly and most of the waterfalls in the famous valley are dry by midsummer."

In Pennsylvania very little forest is left which is worth anything for timber, and the railways have used up nearly all the hard wood fit for ties. The past generation of Ohio farmers has burned in "log-heaps," forests of as good oak, ash, hickory and walnut timber as ever grew; and the next generation will be wondering what is to be done for want of rail timber.

The idea of cultivating forest trees does not strike a fast going American very favorably. It is too long to wait, but the time required to produce well grown trees is over-estimated in the public mind. About the year 1845, a large and voracious caterpillar, made its appearance in a part of Warren county, and stripped every tree in the woods, except walnut and hickory. Sugar, oak of all kinds, and ash were all stripped. The worms appeared the second and the third year, and by that time the trees were dead. On a small lot, about thirty acres, they were replaced by brambles, which during several years furnished blackberries for the neighborhood. After a while, young trees began to show their tops above the briars, and as the trees grew, the briars died, seeming to have protected the young plants until they could stand alone. Ten years ago that ground would have furnished more wood and timber than it ever had on it before, and of better kinds.

The writer lived, during his minority, on a farm of 263 acres, with a liberal portion of timber. Stock had been allowed to run wild, and no young timber had grown. About the time the writer left, 1832, stock was kept out of the woods, and on his return forty years after, he found the woods full of thrifty young oaks and hickories. From two acres more good rail-timber could be cut, than the whole farm would have furnished forty years before.

The correspondent of *Garden and Forest* states: "I walked around a piece of wood land which was planted by its present owner, and which has long yielded valuable annual crops of timber for fuel and other purposes."

The town of Eastham, Mass., long ago planted a considerable tract in Great Island with pines, and they have grown well.

About 1857, H. W. A. Cleveland tried to get Boston to buy Middlesex Fells, and George S. Hillard said: "You might as well try to persuade the common council to buy land in the moon"; but now they want to buy the land.

About thirty years ago the sea-beaten promontory of Wood's Holl was bare of trees, and a bleak and cheerless waste. Under the management and direction of Joseph Story Fay, about two hundred acres of it is now covered with dense woods of well grown trees.

On the west coast of Lake Michigan, there was a large tract of barren land in a most exposed situation, which, a few few years ago was covered with drifting sand. Because it was supposed to be worthless, Mr. Robert Douglas chose it as a fit place to demonstrate the practicability of establishing forests under difficult circumstances. He has been entirely successful, and the sand is now fixed and sheltered, leaf mold is beginning to accumulate, and the ground is becoming comparatively moist and productive.

The Kansas City, Fort Scott & Gulf Railroad, held in 1879, a body of bleak, arid land of alkaline soil, naturally treeless, and believed to be incapable of bearing trees. Mr. Douglas has succeeded in having six hundred acres now shaded by thrifty and valuable wood. On this and other tracts, naturally treeless, he has at this time, three million flourishing trees planted five to eleven years ago, and he has offered to guarantee the growth of eight hundred thousand trees on the bare islands of Boston harbor.

The only States which have made any general movement for forest preservation are Massachusetts and New York; the former for the purpose of reserving small tracts for park purposes; and New York for the preservation of the Adirondack region. But so far the legislation of the latter seems to be declaratory only, and no serious effort made to enforce the declaration.

In France, successful efforts have been made. In the French Alps, torrents have been dammed so as to entirely check the current. In a gorge with a descent of thirty feet to the hundred at the mouth of which was a health resort of warm springs, the rocks were tumbling down at almost all times, so that the most intrepid mountaineer would only venture across the mouth of the combe on a run and never thought of entering its depths, yet in five years the combe was subdued and the descent of the torrent reduced to its perpendicular fall between the dams, and the mountain side covered with grass.

The torrent of Grallaz, in 1880 was a constant menace to the wagon road between France and Italy and the Mt. Cenis railroad, and at one time it seemed certain that the railroad would have to be removed to the other side of the valley; but now the steep narrow gulch down which vast quantities of mud and stones were carried at every rain, is a broad, open bed, its steepness all taken up by the fall of the dams, and it carries no waste to the valley below. Canals for irrigation have been dug from the various dams, so that the torrent is now enriching the very fields it was before destroying.

In three separate regions, five hundred and seventy nine square miles of forest have been created since 1860.

The writer, on a visit to Philadelphia a few years since, had to look to a city directory for the location of Bartram's Botanic Gardens, and on searching the neighborhood, was unable to find any person who could tell him where it was; but upon stating its location, was told a certain street would take him there. He found a lane with a row of fine forest trees on each side, and knew he had found the place. The house, a stone one, so strongly built it could hardly be destroyed, was there, as Bartram left it, as were the trees he planted; but both showed that they had been left to care for themselves since he left. Since that time, the city is said to have taken steps to care for them.

The Arnold Arboretum, at Boston, where one hundred and fifty acres are devoted to the cultivation of woody plants, trees, vines and shrubs, is said to contain a "collection of woody plants more complete and satisfactory than in any of the great botanic gardens of Europe." The Missouri

Botanicla Garden at St. Louis, has also a good collection, intended to illustrate and teach forestry.

The largest private enterprise of the kind is that of George W. Vanderbilt, near Biltmore, North Carolina. It is to contain fully seven thousand acres and to be made up of such trees and bushes as are indigenous to the region or are likely to be of commercial value; with specimens of all other trees that can be obtained from any part of the world with a reasonable hope that they will flourish under the conditions of climate and soil of the locality, making of this an experiment station and a nursery of living trees.

In the nursery there are now in cultivation, of the Rhododendrons and other smooth leaved evergreens, 20,000 plants, not including Ivies; and the creeping or climbing plants, 100.000. There will be little space given to what are known as ornamental varieties. The stock of trees and bushes of merchantable size now numbers about 100,000, of seedlings and cuttings propogated on the grounds during the past year. about 500,000.

The general government has taken action on the matter of forest preservation, which, there is reason to hope, will prove efficient. Its purpose is to keep the forest, not for the natural scenery or as a place for recreation and hunting, but to secure a supply of wood and timber, to protect the mountain from total deundation and protect the water supply of rivers.

In 1875, at the suggestion of Dr. John A. Warder, the American Forestry Association was formed.

In 1876 Dr. Franklin Hough was appointed to report on the subject, and at his suggestion, the Forestry Division of the Department of Agriculture was organized.

The President is authorized to declare by proclamation, the establishment and limits of reservations. Among the reservations established and prepared are the following:

The Flat Head and Marais River, 7,000 square miles.

The Tulare, 7,000 square miles. This is on the western slope of the Sierra, and includes the water shed of the San Joaquin and streams that flow into Lake Tulare.

The Pecos River.

Pikes Peak and its slopes, 350 square miles, which now furnishes timber and fuel for 30,000, people and water indispensable for irrigation.

The Minnesota, 6,000,000 acres. This was vigorously opposed at first, but when it was learned the object was to prevent forest fires and stealing, the opposition seems to have subsided.

The White River, 2000 square miles.

The Turtle Mountain, 2000 square miles.

The Lost Park, Colorado, 500 square miles.

The Crater Lake, 360 square miles, in the Cascade Mountains, southwest Oregon.

And greatest of all, the Yellowstone Park and the Yosemite.

The greed of man hesitates not at human or any other rights, and in submission to its dictates, two bills have been introduced in Congress:

1. A railroad company wished to run through the Yellowstone Park, but the law did not permit it, so they propose to reduce its limits and thus accomplish their purpose.

2. Another bill proposes to lease the whole park to four men with power to build hotels, run cable cars, quarry stone, manufacture brick, use timber for fuel and building, etc., for twenty years, and renewable for twenty more.

To show the necessity for the prevention of forest fires and the success that may be obtained in it, a correspondent of *Garden aud Forest* says: "Three years ago when Tom Agnew—an old mountaineer—came down out of the mountains, he counted ninety-two forest fires on the watershed of the Joaquin between his place and Jackass meadow. The sheep had gone out just ahead of him. Last year there were no sheep in that part of the country and there was not a single fire. The herdsmen's campfires and pipes had gone with the sheep.

Mr. French makes a wise suggestion. He says "under the present condition of our laws there can be no better plan than to employ our army as forest guardians. * * * Why might there not be a Chair of Forestry at West Point and a Forestry School to teach the soldiers practical forestry in one of our western reservations?

"The most important thing, however, at the present time is to save the forests in the public domain at all hazards from fires and thieves, and this can be done under present laws only by the use of the army."

Lieutenant Wood, who is in command of the Yosemite Guard, is very enthusiastic about the effects of the patrol work on his men and horses; and while we might expect the average military man to treat with haughty disdain the proposition to make a forest guardian of him, yet it would surely be a wiser use of them than to keep them to guard a few bucks and debauch the squaws and shoot them and their pappooses.

Dr. Townshend remarked that the usefulness of planting for protection was well illustrated in the vicinity of Edinboro and Glasgow. In 1840 the region roundabout was bare and cold, with raw northeast winds. In 1884 this was entirely changed by the planting of a belt of evergreens—Scotch Firs—and the effect was most beneficial.

Prof. Lazenby thought tree-cutting is too loudly denounced. We must get rid ofblind honor or mawkish sentiment on this point. The real point is that *we are cutting trees and not replacing them.* We should plant better trees, stop fires and pasturage and cut out poorer sorts to favor the growth of the better. He inquired how many kinds of trees are planted in German forest reservations. Prof. Kellerman replied that the number is very small. "I recall a large area on which only one sort was growing, but in all stages—trees just planted, some half grown, and in other parts they were being cut down for use. The rows looked too straight to please one accustomed to American forests."

TILLAGE.*

BY PROF. THOMAS F. HUNT,

[A SUMMARY.]

The culture of the soil referred to in this paper is that known as summer tillage or intercultural tillage, that culture given after the seed bed has been planted and does not refer to the preparation of the seed bed itself. The culture of corn will be particularly referred to both because the experiments which have been made by myself in soil culture have been made principally on corn, and because the corn crop is the largest American cultivated crop. Indian corn occupys one-third the tillage area of the United States and the other two-thirds of the tillage area is mostly devoted to cereal crops to which no intercultural tillage is applicable.

Soil culture as ordinarily practiced does two things. It kills weeds and stirs the soil. Although stirring the soil kills the weeds the two results are entirely different.

Why kill the weeds? Weeds do harm in several ways.

First. They consume plant food. From analyses of about 50 species of weeds by Dr. de Roode, Prof. Millspaugh concludes that the nitrogen, potash and phosporic acid removed by a ton of water-free weeds would cost about ten dollars in commercial fertilizers. A ton of pig weed may contain as much phosphoric acid, about twice as much nitrogen and four to five times as much potash as a ton of ordinary barnyard manure. It is entirely, possible, however, to supply in an available form all the fertility that was used by the weeds. Every one knows that if we did so and allowed the weeds to grow, we would not get nearly as good a crop of corn as we would if we applied no fertilizer and kept the land free of weeds.

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*Portions of this paper have appeared in Farm and Fireside, July 1, '92.

Second. Weeds shade the ground. They obstruct the sunlight and, hence, perhaps make the soil cooler. Corn needs plenty of warmth and sunshine. Potatoes, however, are raised successfully when mulched, but can not be raised successfully if the weeds are allowed to grow.

Third. Weeds evaporate large quantities of water. Experiments made in Germany and in England show that for each pound of dry substance produced in a growing plant about three hundred pounds of water are transpired by the plant. The evaporation in a dry climate would be greater than in a humid one and hence would probably be greater in this country than in Europe.

I have known corn to increase in one week at the rate of 1,300 pounds of dry matter per acre. This would require the evaporation of 345 tons of water—equal to three inches of rainfall. Weeds growing on the same land would also be pumping water out of the same reservoir and rob the corn to the extent of their evaporation. The yield of corn in a given field is controlled more largely, undoubtedly, by the rainfall than by any other factor.

At the Illinois Station, eighteen plats grew the same varieties of corn in 1887 and 1888. Both seasons the seed, the preparation of the seed-bed, the planting and the cultivation, was as nearly the same as possible. The first season the yield of shelled corn was 32 bushels per acre; the second season the yield was 94 bushels per acre. The rainfall during the five growing months in 1887 was 12.9 inches, while in 1888 it was 22.5 inches.

The average temperature during these months was 73 degrees Fahr. in 1887 and 69 degress Fahr. in 1888. Several years of observation has convinced me that as compared with the rainfall, temperature within the usual seasonal variations, has little influence upon yield, but mainly affects maturity.

Dr. Sturtevant observed the difference in practice among the vineyardists of New Jersey. Those on the lowlands allow the weeds to grow; on the uplands the soil is left free of weeds. The weeds pump the water out of the wet land to the the advantage of the grape, which prefers a dry soil.

What does stirring the soil do?

First. It increases the plant food of the soil by causing the air to circulate more freely and by bringing the particles of soil into different relations one with the other. When a chemist wishes to increase the chemical action between two substances he stirs the compound. Roots not only cannot grow in the absence of oxygen, but oxygen is essential to the micro-organisms which are all the time making plant food available.

Second. Stirring ordinarily makes the soil looser, so that roots may penetrate more readily.

Both these things are, doubtless, important, to what extent we are unable to say, but they are probably much less important than has generally been supposed. If, however, we cultivate the soil deep enough to help in either particular we necessarily break many roots and in doing so we injure the corn plant much more than the possible benefit to be derived in stirring the soil. This would probably not be true with all cultivated crops. It would depend largely upon the nature of the root-system.

Third. Cultivation *may* check the evaporation of water from the soil. It is perfectly obvious that if two inches of cut straw are spread upon the surface of the soil the evaporation from the soil will be checked. If the surface of the soil is sheltered from rain, but exposed to the sun's rays and is at the same time kept thoroughly stirred, the stirred portion will become dry and instead of acting as soil will act as a mulch. Under the above conditions I have shown that the total evaporation may be checked at the rate of one-fourth of an inch of rainfall per week.

When, however, the soil is exposed to the usual atmospheric conditions, the surface mulch tends constantly to take on the functions of soil. Every shower produces this effect, and while the soil is being again stirred and dried so as to act as a mulch, the total evaporation is increased. It is simply a question whether the evaporation from the lower soil is checked more than that from the stirred portion is increased. It is easy to see that the surface mulch or "dust blanket" may be converted into soil at night by the precipitation of vapor arising from the warm soil beneath and coming in contact with the colder air at the surface of the ground. I have little doubt but that this is an important factor in many cases.

It is evident, therefore, that whether or not surface tillage conserves the moisture in the soil must depend on the soil and the atmospheric conditions of the season. Experiments which I have carried on during the past three years, throughout a considerable portion of the growing season fail to show any appreciable benefit from the surface tillage in checking the total evaporation of water. Obviously in a different climate the results might be different, but so far as I know, it has not been shown to be different in any other soil and climate during a series of years. It is well to insist, however, that the amount of evaporation checked by surface tillage, even under favorable conditions, is inconsiderable compared with that which may be caused by the growth of weeds.

Fourth. Tillage increases the absorptive power of the soil. If the soil is stirred, more of the rain which falls upon the surface soaks into the soil and is retained there for the subsequent use of the crops. A mulch of cut straw acts in this way also. Doubtless the deeper the cultivation the greater the "sponge" power of the soil. It is easily possible that under certain conditions, the advantage derived in this manner, say when the rain-fall is distributed at long intervals in sharp, heavy downpours, may compensate for the injury done by the deep cultivation.

It is important to discriminate between checking the evaporation by constant surface culture and increasing water supply by increasing "sponge" power of the soil.

To stir the soil sufficiently to check evaporation effectively, if it can be done at all in practice, the tillage must be constant, say every two days, but most soils may be kept sufficiently loose to absorb the rainfall by stirring once in two weeks.

A considerable number of cultivation experiments have been made with corn, to determine the amount of cultivation necessary for a maximum crop. A summary of these experiments show that cultivation once in two weeks is sufficient for a maximum crop, provided this cultivation keeps the land free of weeds. So far as stirring the soil itself is concerned, once in two weeks is as effective as stirring more frequently.

Stirring the soil two inches deep has, taking the average of 25 experiments, given about four per cent. greater yield than deeper cultivation. It has been conclusively shown that the deep cultivation is injurious because a large portion of the roots are broken by the cultivation, and that this mutilation begins when the plant is quite young, although the plant seems able to recover from this injury when yonng more easily than when it becomes larger. A summary of the experiments in root pruning, corn shows an average decrease in yield of grain of 17 per cent. due to the root pruning.

Good crops of corn have been raised without any stirring of the soil after the corn was planted when the weeds were thoroughly removed, showing that stirring of the soil is not in itself essential to the growth of the corn. Shallow culture was found to give better results than no culture, but no culture gave better results than deep culture.

The practical deductions from these experiments are: We must cultivate to kill weeds. In practice, we must stir the ground some in killing the weeds. It is not advisable to cultivate deeper nor more frequently than is necessary for the thorough eradication of the weeds.

STRAWBERRIES AT COLUMBUS IN 1892.

BY W. J. GREEN, HORTICULTURIST, OHIO EX. STATION.

It may seem to some that there is an unnecessary amount of attention given to varieties of strawberries, by commercial growers and amateurs. The reason for the interest in the subject, so far as the practical fruit grower is concerned, is mostly because of its financial importance. If one would make money in fruit-growing, he must not only pursue the best methods, but must cultivate the best varieties. New varieties are constantly coming into notice, and one must be on the alert in order to learn all that is known about them.

There is comparatively little change in methods of cultivation, but change is the order of the day in varieties. New varieties are like new fashions, always interesting to certain classes of people. There is a fascination about them which touches the amateur as well as the commercial grower. This interest never seems to lag. In spite of the fact that we have been in possession of good varieties almost from the beginning of our efforts in fruit-growing, we alway live in the hope that the new will prove to be better than the old. In the majority of cases these hopes have been disappointed, yet there has been a gradual improvement. We have more good varieties than we had ten years ago, and we expect to be still better off ten years from this time. But if experience is any criterion, we must expect to winnow much chaff to get a little wheat. There is a pleasure in testing varieties, even though we are often disappointed, and there is a still greater fascination in producing new sorts, although the probabilities of disappointment are still greater. A few years since we grew about 10,000 seedling varieties at the Experiment Station. A few hundred were thought worthy the first season, but the final verdict was that none were worth saving. These were chance crosses, but later we had several hundred plants that were from Crescent and Sharpless crossed. Quite a large per cent. of these have been marked for further trial, and possibly a few may be found worthy of perpetuation. We may choose as carefully as may be the varieties that are to be used in making crosses, yet we can not be certain of the results. The progeny of two choice varieties may be inferior, and seldom is better than either or both parents.

If good varieties crossed are liable to produce poor ones, and we are unable to predict what the result of a cross will be, it is plain that we are not very far advanced in the art of improving fruits. Such is the fact, and yet I believe that the best plan is to keep on crossing and hybridizing. There is probably a larger per cent. of good varieties from desirable crosses than from indiscriminate crosses that occur through the agency of the wind and insects. Surely it is desirable to know the parentage of varieties in order that some law may be traced which will guide in future work. It is therefore better for experimenters to work systematically, whether looking for present or future results.

Quite a number of new varieties are sent out each year, and still more are placed on trial at the Experiment Station and in the hands of individuals. Of those sent here we find very few that are worthy, because of some weakness that may not have appeared on the grounds of the originator. It would not be of interest to those present nor to the readers of the JOURNAL, to give an account of these probationers.

The most interest attaches to the varieties of recent introduction, which have been frequently referred to in strawberry literature. Two varieties, the Stevens and Michel's Early, have been much praised because of their earliness. They have not been overrated in this respect, for both are early, but other qualities have been ignored, or overlooked.

Both have serious faults that will consign them to early oblivion. The foliage of the Stevens is very weak and the plants quickly succumb to rust. Michel's Early is quite the opposite, but the berries are small, soft flavorless and not very plentiful. Not so much has been claimed for the Beder Wood as for the above, but it is much superior to either. It may be a day or two later, but produces finer and larger berries, and more of them. Barring a slight tendency to rust we can give it almost unqualified praise as an early and medium variety. It has perfect blossoms and it seems to be very nearly the kind of a berry that growers here have been looking for as a pollenizer. Muskingum is another of the kind that we have been waiting for. It has perfect blossoms, the berries are quite large and beautiful and are produced in considerable quantities rather late in the season.

The Parker Earle seems, however, to be the best of this class. It produces few plants, but a large number of berries of good size and fair quality. Overproduction may be its weakness, hence upon some soils, and in some seasons it may partially fail. I believe it to be an uncommonly good variety. Lovett's Early is wrongly named for it is medium, not early, but it has many qualities that make it very promising. It will do well to plant with Crescent or Haverland.

Of the imperfect flowered sorts, there are none more promising than Barton's Eclipse and Greenville. Both have healthy foliage and are productive of large showy berries. Still other promising sorts are Shuster's Gem, Woolverton, Saunders, Martha.

The unpromising varieties are numerous, but the following are easily distinguished because of their marked inferiority: Gale, Dew, Hatfield, Porters, Millers, Walton.

The best of the old varieties are Haverland, Crescent, Bubach, and Warfield.

Considering the great value of these four reliable varieties, we might almost be forced to admit that there has been no advancement within the last three years, but it must not be forgotten that we now have some very reliable, perfect flowered sorts that were not known five years ago. If we could find one good variety each year, we might rest satisfied, but we have done better than that within the last three years.

OUR VIOLETS.

E. E. BOGUE.

There is probably no plant so well known the world over as the violet. Poets of all ages, classes and climes have sung its praise. Some evidently refer to one species and some to another as the fancy of the author may dictate. And yet with this plant as with many others there are some of its ways of growth and reproduction that are known to but few. Our common blue violet, *Viola palmata* var. *cucullata*, is the best known for its showy flowers, but most people have only speaking acquaintance with it.

What per cent. of the people that know what the violet is, ever saw the seeds or thought when and where they are formed? Not likely more than one in ten ever saw the seed of the blue violet. People in general see only the showy flowers that are produced in spring. After these are gone, the leaves make such a rank growth that they cover over the fruiting or cleistogamous flowers that are produced in September and October. If during these months we push aside the leaves, down close to the ground we find pods bursting with seed. It was certainly the blue flowers that Will S. Faris had in mind when he said:

"I know—blue, modest violets,
Gleaming with dew at morn—
I know the place you come from
And the way that you are born.
When God cuts holes in Heaven,
The holes the stars look through,
He lets the scraps fall down to earth—
The little scraps are you."

One author must have admired some of the light-colored species, perhaps the *V. blanda*, when he wrote:

"Violets dim,
But sweeter than the lids of Juno's eyes,
Or Citherea's breath."

Lowell pays a tribute to the sweet violet in these words:

"Violets—sweet violets,
Thine eyes are full of tears;
Are they wet even yet
With the thought of other years?
Or with gladness are they full,
For the night so beautiful,
And longing for those far-off spheres?"

O. W. Holmes was an admirer of this plant for he has written these lines:

> The violet gazing on the arch of blue,
> Till her own iris wears its deepened hue.

And again:

> When wake the violets winter dies.

As a matter of fact they often can not wait until it is time for winter to die, but bloom in November or December, before the winter comes, when winter "dies a bornin."

One author has written:

> Sweet little violets born in the wild wood,
> Purest and loveliest.

The following words by Walter Powell have been set to music by Mendelssohn:

> "When the first violet spreads its soft bloom
> How fair was its beauty, how sweet its perfume;
> It breathed but of spring time, calmness and rest,
> Gladly I placed it with hope on my breast.
>
> The springtime hath vanished, the violet lies dead,
> Buds far more bright deck its old bed,
> I heed not their beauty in dreams still I see
> The violet sweet hope-flower that bloomed then for me."

Writers seem almost invariably to have ignored the yellow and white species.

The sweet white violet (*V. blanda*) is common in damp places every where.

The round leaved violet (*V. rotundifolia*) is not uncommon in the Eastern and Northern States. It grows in rich woods and produces in summer, large, bright green leaves, that lie flat on the ground.

The halberd-leaved violet (*V. hastata*) not common or local, is found in abundance in north-eastern Ohio. The Canada violet (*V. Canadensis*) is one of the most common northward, with white or purplish flowers.

The pale violet (*V. striata*) has creamy white flowers, is common in our range, and blooms all summer. The long spurred violet (*V. rostrata*) is not uncommon in rich woods.

There still remains to be mentioned the species to which we ought to pay the highest tribute, and this is the Pansy, or Heart's Ease (*V. tricolor* var. *arvensis.*) It has been introduced into this country, and grows wild in great abundance in some places. This is the species whence all our common forms of pansies have come.

European and Asiatic species have also brought forth some fine varieties. The universal knowledge of cultivation need not be mentioned here, further than to say that all of our native varieties and species take kindly to cultivation. The French call the pansy *pensee*, meaning thoughtfulness, suggested by the nodding flowers, and from the French verb *penser*, meaning to think. The roots of several species of violets were formerly used in medicine. They contain an alkaloid called violine, which acts as an emetic and purgative. The petals of the sweet scented violet are used in the preparation of the Juice or Syrup of Violets, which is used as a gentle purgative for children. The bruised leaves of *V. tricolor* are sometimes used as a remedy for ringworm.

It was brought out, following Mr. Bogue's excellent paper, that the sweet scented violets so much referred to in literature are the European species, and that the color so often mentioned—blue—is of the same European sort.

In Memoriam.

FRANCIS C. SESSIONS.

To the Columbus Horticultural Society:

Your committee appointed for the purpose of preparing a memorial on the death of Francis C. Sessions, a member of this Society, makes the following report:

FRANCIS C. SESSIONS, a member of the Columbus Horticultural Society, was born February 27, 1820, at South Wilberham, Mass. Having obtained a good common school education by his own exertions, he came to Ohio in 1840 and entered the mercantile business, which he followed successfully for many years, acquiring by his honesty, economy and industry a considerable fortune. In 1869 he organized the Commercial Bank, which afterwards became the Commercial National Bank, and remained at the head of the institution to the day of his death. During his long business career in Columbus he was connected with many of the most important business enterprises, and by his public spirit and faith in the future importance of the city and its success as a business center aided greatly in the development of its resources and in attracting to it capital and business energy. Always public spirited and liberal he improved himself by travel and study in order that he might make himself more useful to his fellow citizens. His literary work was of such nature as to attract particularly the attention of busy men who have no time for extended or exhaustive study and was therefore especially useful in the field which it covered. His love of art and literature he has bequeathed to his adopted city in a substantial manner. No citizen of Columbus, blessed with ample means, has shown better capacity for using a large fortune properly, not only for his own comfort and enjoyment but for the good of his fellow men.

The members of the Horticultural Society have especial reason to regret his loss. For many years an active member of the Society he did much toward building it up and keeping it alive through discouraging circumstances. In connection with other older members of the Society he made Horticulture at one time a special study and did much in the way of practical experiment toward demonstrating the usefulness of the organization in its particular field, although he always preferred the pursuit of botanical subjects, and at his own home could be found many of the rarest plants and flowers, the possession of which is denied to the majority of men, but which he was always glad to exhibit to his fellow citizens, and which he has given in trust for their benefit.

A good and useful citizen has passed away.

The Columbus Horticultural Society has lost one of its most honored members.

Therefore be it resolved, That we record with deep regret the death of our fellow member, Francis C. Sessions, as an irreparable loss to the Columbus Horticultural Society.

That the foregoing memorial and resolution be spread upon the minutes of the Society and that a copy be furnished by the Secretary to his widow.

Respectfully submitted,
G. W. SINKS,
F. F. D. ALBERRY, } *Committee.*

REPORTS OF STANDING COMMITTEES.

BOTANY.—MAY.

BY AUG. D SELBY, CHAIRMAN.

The time, the place, the circumstance, determine for us in botany as in other affairs. It has seemed to the chairman at this meeting held on the outskirts of the Appalachian flora of Ohio, fitting to regard particularly a few of the plants which grow abundantly here at Central College, especially east of the Big Walnut, and but sparingly or not at all elsewhere to the westward. Franklin county presents a peculiar topography or rather a peculiar arrangement of its water courses, which are remarkable both for their size and numbers. Nearly all flow through the county from north to south, and with unimportant exceptions, in nearly parallel directions. The geological formations have such positions that this appears a manifest conformation of the course of the streams to the line of outcrop of the various rocks. In evidence, further, the streams appear to be wearing on their eastern banks, since the dip of the county rock is to the eastward or southeastward, and following this slope of the basal strata, the streams have in most places in the county a high, bluff-like eastern bank and a low, gently rising or less abruptly rising western bank. This fact, more or less general in its application to topography, has its special interest in this vicinity. In passing from this bank of the stream to the opposite hilly one, whose red knobs are so easily seen, we pass from the usual flora of the county to the unusual type of plants. Once on those bare red or wooded hills we can, without great stretch of the imagination, picture to ourselves that we are beginning the Appalachian ascent. Those who have gone with the city students of botany on their spring excursions to Sugar Grove, further southeastward, may well say they have reached the summit of the aforesaid mountain range.

At any rate, we have east of the Big Walnut enough for the few minutes I shall take for this topic. I have with me blossoms from the wild cucumber tree, *Magnolia acuminata*, climbed a few minutes ago. The flowers are green and not at all conspicuous, and are much less beautiful than those of its near relative, the tulip tree. The Magnolia, however, has not been found growing wild elsewhere in the county. A small poplar, *Populus grandidenta*, whose large-toothed leaves are very striking, grows on yonder shale bank well down to the water's edge. It is very scarce elsewhere. At this time we miss two flowers which in earlier spring clothe with beauty many a bare knob. They are the bluets, *Houstonia cærulea*, and the moss pink, *Phlox subulata*. Often I have seen the dull hillside brilliant with them. A few specimens of both may be collected to-day. Another Houstonia, *H. purpurea* var. *ciliolata*, grows abundantly and is now in blossom. In common with the bluets it has most interesting flowers in their adaptation to insect cross fertilization, i. e., the flowers are dimorphic. If you will examine carefully the different clusters of it, you will find two types of blossoms on the separate tufts. One has the stigma to receive the pollen protruding beyond the tube of the corolla and the anthers holding pollen far below in the corolla, while another on a different cluster of plants will show protruding stamens, and when further examined will be found to have a very short style bearing the stigma at its summit, but both far down in the flower tube. This structure in one case prevents self-fertilization, or, rather, self-pollination, and in both secures cross-pollination through the visitation of insects. The arrow-leaved violet, *Viola sagittata*, grows also on the dry bank, while the slopes are now becoming orange with the mountain dandelion, *Krigia amplexicaulis*, a plant likely to puzzle the beginner somewhat. In later summer and fall the distinctive features of the Central College plants still hold; hence, this is always an interesting place for the botanical and entomological collector.

ENTOMOLOGY.—MAY.

BY PROF. F. M. WEBSTER, CHAIRMAN.

The present season appears to have, so far, at least, been distinguished by the usual amount of insect depredation, and, unfortunately, some of these last are unfamiliar and their authors new and unwelcome guests. Owing to the great number of plant-lice, produced last year, upon which the Snowy Tree Cricket (*Oecanthus niveus*) feeds, the latter insect also became quite abundant, and, therefore, it is not to be wondered that their punctures for the purpose of oviposition in the canes of the raspberry should be a prominent object this spring.

Complaints of this injury have been as numerous and widely distributed as those relating to any other insect. Probably the next species in point of numbers and amount of inquiry occasioned, is the Grape-vine Flea-beetle (*Haltica chalybea.*) Considerable trouble has been reported, both in Ohio and Indiana, the beetles eating the young buds of the grape. This, however, does not necessarily imply serious injury during the remainder of the season. Plant lice, on cherry and plum especially, seem to be quite numerous in many portions of the State. But for the cold, wet weather, their natural enemies would probably have kept these down. As it is, there is not much to be feared from their attacks, as their parasites will, probably, hold them in check after a few weeks. The Apple-tree Bark-louse (*Mytilaspis pomorum*) has occurred in excessive abundance in some localities. For this a thorough scrubbing of the trees with kerosene emulsion, or soap suds made with whale oil soap, will, I think, prove effectual. In Ottawa County the Buffalo Tree-hopper (*Ceresa bubalus*) did a great amount of damage in a young peach orchard, even necessitating the destruction of quite a large number of trees, this spring. The bark of some of these was a complete mass of egg punctures. This is a difficult insect to destroy, about the only way being to prune off and burn the injured twigs. The young attack young potato and tomato plants. At the Experiment Station the cabbage maggot (*Anthomyia brassicæ*) has caused some trouble, we find the application of a very little bi-sulphide of carbon, poured in a small hole made in the earth about the roots, and this quickly filled with earth, is a thorough remedy. I have now to report the appearance of a new insect pest in the clover fields of northern Ohio, the Punctured Clover-leaf Weevil (*Phytonomus punctatus.*) This is a curculio which lays its eggs among the clover, and the larvæ destroy the leaves. Its first depredations were observed in New York some years ago, from whence it has been steadily working its way westward. At present, it is not known to occur beyond the northeastern counties, but it will, probably, spread over the whole State.

Full information, with suggestions with reference to remedial measures, will soon be given in some of the Experiment Station publications.

JUNE.

The Four-striped Plant-bug, *Pœcilocapsus lineatus* Fabr, is a bright yellow bug about three tenths of an inch long with black antennæ and two black stripes on each of its wing-covers the outer one terminating in a black dot. This is an enemy of the currant not usually numerous enough to attract attention, but has recently been reported as very injurious to the foliage at Richwood, Ohio. The injury is done largely at least while the insects are still in the larvæ and pupæ stages. In destroying them pyrethrum or kerosene emulsion must be used as arsenical poisons will not affect them.

The Rose Chafer, *Macrodactylus subspinosus*, seems to be getting in its work pretty generally over the northern part of the state. Here, about Wooster, they are attacking the willows. I notice also about town that the Rose slug *Selandria rosæ*, Harris, has seriously affected the foliage of many rose bushes. The abundance of Lady Beetles, both larvæ and pupæ also about the bushes, and a lack of the depredators leads me to infer that at least one species of Coccinella probably *C. 9-notata* has been doing a good work in destroying them. White hellebore is probably the best insecticide that can be used.

Apropos of the above I have just received advices of the ravages of our Pear and Cherry slug *Selandria cerasi* in far off Tasmania.

Just before leaving Columbus, I noticed that the Maple Bark Louse was becoming exceedingly abundant along Neil Avenue. The little Lady Beetle, which was thought to have overcome them last year appears to have failed—in part at least. To people who have hose and can turn them on their trees it may be interesting to know that at about this time many of the very young may be killed by thoroughly drenching the trees every day While all of the insects may not be destroyed in this way, it will be found to afford good protection.

VEGETABLE PATHOLOGY.—MAY.

BY W. A. KELLERMAN, PH. D., CHAIRMAN.

This "field meeting" as it might be called, has enabled me to place fresh specimens before you of many fungi which cause more or less injury to our useful plants.

Some of these as the Peach Curl, the Black-knot and the Bramble Rust are readily recognized and more or less thoroughly known to you all.

The first, Peach Curl is excessively abundant this year. I have seen no trees entirely free from it, and in most cases observed here and in some of the adjoining counties, scarcely a single leaf on the entire tree could be found that was not affected.

The fungus is now in its fruiting stage, that is, the spores (in sacs, or *asci*, forming a continuous layer over the whole diseased portion of the leaf) are ripening, the leaves are manifesting signs of exhaustion, will shortly fall from the tree and the cup of spores—or seeds as they might practically be called—are being scattered to further spread the disease. The spores of the Black-knot ripened in late winter—but upon search new knots in their incipient stages may be found. The Bramble Rust, also universally abundant this season, is now in its brilliant stage scattering its countless millions of spores. These three fungi are perennial in the tissue of their host plants and therefore mere destruction of the ripening spores—while it might even perceptably check the disease—will not destroy the fungus that luxuriates safely within the hosts. Complete destruction according to our present experience calls for an heroic remedy, namely, the destruction (burning) of the infected plants themselves together with their internal and infernal parasites.

The other fungi here shown that you may learn to recognize even the less showy species, are for the most part such as are quite conspicuous and found mostly on weeds or plants that are of no economic value. They need not be mentioned singly and by name; but the point I wish to emphasize is this, namely, that many of them are parasites that attack also some of our cultivated plants or are perhaps to be suspected at least, since they are on hosts which are near relatives, sometimes even of the same genera as the cultivated plants. It is evident upon the slightest reflection that in such cases no better way could be devised for spreading these injurious parasites than to have a hot bed, so to speak, of weeds whose business is to produce and scatter in countless myriads the seeds (spores) of these enemies. Therefore the injunction is imperative, DESTROY YOUR WEEDS.

No thrifty farmer or horticulturist allows weeds to grow in his fields or gardens to rob the soil of the plant food that should go into the coveted crop. But it is also to be remembered that the fence corners and out-of-the-way places, if not cleared of weeds may even more seriously interfere with the production of perfect and abundant fruit.

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PROCEEDINGS OF THE SOCIETY.

JULY.

The Society met in the Botanical Building, Ohio State University, July 30th, at the usual hour.

J. J. Janney was appointed Secretary *pro tem.*

The reading of the minutes of last meeting was dispensed with.

Prof. Kellicott submitted a report for the Committee on Entomology, for which see the report itself.

W. J. Green spoke concerning the fruit crop, which is very light; pears are a good crop, grapes are reported to be rotting badly.

Incidentally, Prof. Kellicott stated that the Horn Fly, imported a few years since from Europe, is present in Ohio. It was troublesome in New Jersey for a few years. The remedy is kerosene emulsion.

The regular program was carried out:

Raspberries at the Ohio Station—E. C. Green.

Growing Raspberries in Virginia—Prof. Wm. B. Alwood.

There being no further business the Society adjourned.

J. J. JANNEY,
Secretary pro tem.

AUGUST.

The Society met in Botanical Building, pursuant to notice.

In the absence of the Secretary, E. E. Bogue was appointed Secretary *pro tem.*

Under call of the Committee on Botany, Mr. Bogue reported two new re-collections of county plants, *Aplectrum hiemale* and *Hibiscus militaris.*

Prof. Kellicott, on Entomology, reported that the results of his study of the squash borer conclusively show that this insect is double brooded, a point of great practical importance. He also spoke of the meeting of Entomologists at Rochester in connection with the meeting of the American Association, giving encouraging reports of their labors.

Mr. W. J. Green exhibited specimens of pears from sprayed and unsprayed trees. Bordeaux Mixture and Paris Green were used in the spraying. The pears had nearly all dropped from the unsprayed trees.

Dr. Aldrich reported Flemish Beauty as nearly spoiled by the "crack," and that Clapp's Favorite was affected.

Mr. Green advised the use of copper sulphate in spraying for this disease.

On Fruits, Dr. Aldrich reported a great abundance of pear and cherry slugs on young trees in nursery now.

Under Plants and Flowers, Dr. Townshend stated that a specimen of *Magnolia purpurea* which had bloomed profusely in spring had blossomed again in August. The flowers of the second blossoming were not so numerous, but were as large as usual, though not so fertile.

Under Vegetables, President Wilson stated that he had on his farm a very, very large crop of potatoes.

The regular program was carried out as follows:

Varieties of Plums—Dr. O. W. Aldrich.

New Jersey Notes—Aug. D. Selby.

On motion President Wilson and Dr. Aldrich were appointed a committee to invite the State Horticultural Society to hold its next annual meeting in Columbus.

The bill of Hugh Boyd, of New Brunswick, N. J., for printing notices of July and August meetings, $4.35, was allowed and ordered paid.

Mrs. Lou Burdg, wife of Secretary Burdg of the Greene County Horticultural Society, was a visitor at the meeting.

The Society then adjourned.

E. E. BOGUE,
Secretary pro tem.

SEPTEMBER.

The Society met pursuant to notice, Saturday, October 1st, at 2:30 P. M., with a full attendance, Dr. Townshend presiding.

Mr. Roscoe B. Smith, of Columbus, was elected to membership.

Mr. Selby, of the Committee on Botany, reported briefly upon some noticeable features of the New Jersey flora, among which the summer had been passed, mentioning that of the salt marshes and pine barrens as especially striking to one from Ohio.

Prof. Kellicott submitted a very interesting report on Entomology. He expressed the desire that members bring to the meetings such specimens of insects or injured plants as may fall under their observation. The chairman of the committee could then make an objective report upon the things presented.

Prof. Kellicott inquired whether a squash vine would run down the slope when growing upon a hill-side. A negative answer was given.

Prof. Lazenby gave some interesting notes upon the Meteorology of Great Britain. The temperature is equable, there being but a few degrees difference between that of northern Scotland and southern England, about 48° in one case and 51° in the other. The maximum in Scotland rarely reaches 70° and in London 78° is an exceptionally hot day. The variation in the amount of rainfall is greater than one would suppose, varying from 25 inches in some sections to 80 inches in others. The distribution is such that localities with the less amount of rain do not appear to suffer from lack of moisture.

Attention was called to specimens of two sorts of wild grapes, the one a frost grape and the other a nearly related larger species, both of which had been collected near Georgesville.

Mr. Tussing reported on Vegetables, stating that the present season had again emphasized the advantage of early grown over late vegetables; prices for early ones were exceedingly good. This is well shown in the prices for nutmeg melons, which fell from $4.00 per bbl. to a very low rate in three weeks. Potatoes, in his section, are a large crop and selling readily at 50 cts. per bushel in the field. Onions are selling, also, at 75 cts. per bushel to ship to the onion growing district of Wood county.

Under call of the Committee on Vegetable Pathology, Mr.

Selby referred to the leaf blight mentioned previously by him as injuring melons and cucumbers. He stated that Prof. Webster reports improved conditions from the use of carbonate of copper, and suggested that spraying with the ordinary fungicide mixtures should prove beneficial.

Mr. Turner said that there would be danger of injuring the foliage if even the dilute Bordeaux is used for spraying melons and cucumbers. Such had been the result at the Station and a weaker mixture must be taken to prevent injury to foliage.

Mr. Tussing said that the leaf blight, or possibly another disease, had injured his nutmeg melons badly, and especially upon black ground.

Prof. Kellicott said he had examined unhealthy looking vines at the Station for squash borers and found none, so he had attributed their condition to some fungous disease.

Mr. Werner said that the matter of a National Flower had recently been presented by a communication to Prof. Kellerman, and that it seemed a matter deserving of action by the Society. Of all the plants suggested, it seemed to him that the sun flower was the most available by reason of its distinctive form, wide distribution in the union and general ease of recognition by persons not professed botanists.

Dr. Townshend stated that some years ago the Society had taken action on the selection of a National Flower by vote. After discussion for two or three meetings the vote was taken and resulted in favor of golden-rod, with corn a good second; the tobacco plant, though distinctively American, had been received with scant favor, particularly by the ladies.

The regular program was carried out:

Horticulture in Great Britain—Prof. Willian R. Lazenby.

Forest Insects—Prof. D. S. Kellicott.

The Secretary stated that the Free Scholarship in the University for the present year had been extended by the President and Secretary, upon recommendation of the Executive Committee, to Mr. Chas. A. Phinney. That of 1891 had been given in a similar manner last year to Mr. J. F. Cunningham.

There being no further business, the Society adjourned.

AUG. D. SELBY,
Secretary.

EDITOR'S TABLE.

The meeting of the American Association for the Advancement of Science, at Rochester in August last, was one of great interest to botanists, and if we consider that horticulture belongs more properly to botany than to agriculture, then the importance of the meeting is to be recognized by horticulturists also. A new era for botanical workers in America is inaugurated by the noteworthy action of the Association in establishing a separate section devoted to botany. An unusually large number of botanical papers were presented.

* * *

The old section of biology is given the title zoology and we now have the two sciences set forth under distinctive titles. Botanists strenuously object to the term biology as applied in this country by some zoologists when botany is left out.

* * *

A paper by Prof. L. H. Bailey upon "The Supposed Correlations of Quality in Fruits," read at Rochester, appears in *Garden and Forest* for October 19th. In it he presents a careful discussion of the accepted principle which states that the sum of the activity in any plant is fixed. This idea finds expression in the notion "that the best fruits are tender in tree, unproductive, to lack vigor, or to be small or dull in color." Prof. Bailey finds that the evidence does not support the dogma and sums it up as follows:

"It is evident from our discussion that quality and other characters of cultivated fruits appear independently of each other; that there is no true correlation between these characters. There is a general increase in all characters as amelioration progresses—at least in all characters which are particularly sought by horticulturists; and this fact must ever remain the chief inspiration to man in his efforts to ameliorate plants."

* * *

The removal of the Experiment Station to Wooster leaves the Society without an acknowledged meeting place. No doubt the University authorities will be willing to grant to the Society a continuance of the privileges heretofore enjoyed.

The officers of the Station go with it and this makes considerable inroads upon the Society's membership as well. The encouragement and membership supplied by the University and the Station, have, in connection with the growth of the city, wrought a shifting in the attitude of members and work of the Society. It is to be deplored that the active cooperation of a larger portion of the former membership has not gone with the Society in this obligatory change.

* * *

The last meeting was exceedingly well attended and valuable. Prof. Lazenby permitted his hearers to understand the peculiar conditions attending British horticulture; all must recognize the position of Prof. Kellicott on Forest Preservation as entirely tenable. The meetings will repay students of agriculture, horticulture and botany for regular attendance upon them.

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COMMUNICATIONS AND DISCUSSIONS.

RASPBERRY GROWING IN VIRGINIA.

BY PROF. WM. B. ALWOOD.

Mr. President and Fellow Members of the Columbus Horticultural Society:

Your Secretary has seen fit to publish me for a paper on Raspberry Growing in Virginia, without my consent, hence I shall make no excuses for the matter which follows. However permit me to say it is a real pleasure for me to imagine I am back among the faithful few who have so regularly congregated for years at stated intervals to do noble work for the advancement of our loved art—or should I say to meet the modern trend—Science? But, possibly, I am not talking to those who formerly composed the select disciples of Pomona and Flora at all, and a new company in whole or part may be assembled at your coming together today. Be this as it may, it is quite certain to my mind that our genial president is in his place, smiling as ever, and Brother Janney will constitute an essential element of your company.

It is scarcely necessary to say it would be a great pleasure indeed to be with you, and there are many times when a familiar face from Buckeyedom would be to me almost like an oasis to a weary traveler in a desert.

In introducing my subject, it should first be stated that raspberries are scarcely grown on a commercial scale at all in Virginia, and even amateur culture on a scale which could be called worthy of note, is almost unknown. This is strange, considering the fact that this fruit grows well when given attention, and is truly the most delightful fruit of our climate. Wild berries abound in great profusion in many parts of the state, and are put upon the market generally by poor white people and negroes at the low price of twenty to twenty-five cents per gallon. Many times I hear people say that the wild berries are equal to or superior to the cultivated varieties, but no person competent to judge could long hold this opinion if he would compare our thirty or more cultivated sorts with the best wild plants of the region which I have selected and grown in our test plots.

The culture of raspberries here is in detail not different from good cultural methods pursued elsewhere. We are on a heavy limestone soil which extends with slight exceptions over all the region of Virginia west of the Blue Ridge Mountains. My practice has been to grow in rows about seven feet apart and tie to a wire stretched at a height of thirty inches, as the canes often fall over if not supported. They are apparently weaker than in Ohio.

Of the red varieties, Cuthbert and Turner are the only ones I can really recommend. These grow quite strong and bear good crops; the fruits of the latter are small.

Brandywine is next in value, but is weak here.

Hansell, Marlboro, Red Antwerp, Herstine, Philadelphia, Thompson's Eg. Prolific and Thompson's Eg. Pride are of very slight value. Most of these do not make strong canes, and nearly all are injuriously affected by the climate; Marlboro is especially badly diseased.

There is but one yellow sort, Caroline, which does anything at all with us. This bears abundant crops and is healthy. The other common yellow sorts kill to the ground every winter but make a fair growth of canes each summer.

We have Shaffer and Muskingum of the purple class of raspberries. The first is here as elsewhere, the most rampant grower of any sort I have ever seen, but it kills down nearly and last year quite to the ground, but despite this it bears much fruit of large size and to me is not unpleasant. We find it really good canned. Muskingum is moderate in growth, fruit not large, but is on the whole more desireable than Shaffer. Out of a long list of black caps I can recommend but few. Hilborn, Doolittle, Palmer and Surry are our best so far. These are all medium and small fruited sorts except Surry, which has very good size. The three first mentioned bear heavily, but are not overly vigorous growers.

It may sound strange to you that such old standards as Gregg and Ohio do poorly here. Gregg has been set from three different sources, but fails utterly to make canes or produce fruit. When it does bear it is about as large as Surry. I know of other parties having better success with Gregg, but think it not well adapted to our climate. Carman, Lovett's Black, Souhegan, Norfield, Ada, Earhart and Virginia have apparently no value here.

This may look like a harsh disposal of some old favorites, but I have fruited or rather tried to fruit them for three years. Notwithstanding the fact that few varieties seem to thrive here, I believe much could be made of raspberry culture. We can begin sending fruit to market about June 15, from all the upper regions of the State, and somewhat earlier from tidewater Virginia, and our railroad facilities are such that we reach Cincinnati, Washington, Baltimore, Philadelphia and New York City promptly.

Recently I have gone into fruit growing on a commercial scale, and expect to put raspberries into Cincinnati and possibly Columbus at a profit.

Splendid fruit lands in our mountains can be bought at from $1 to $5 per acre, and it is my firm belief that to bright men who have grit and stick-to-it-iveness we can offer better inducements as a fruit-growing country than California, Florida or any other of the States which have been rated as the fruit grower's paradise.

SOME VARIETIES OF PLUMS.

BY O. W. ALDRICH.

In this paper I shall confine myself to noticing only those varieties which have fruited on my grounds, and shall begin in the order of ripening.

Wild Goose—As this variety is not new and is well known to most persons, I shall only mention the fact that trees on my grounds, standing at such distance from other varieties that the pollen would not readily reach them, bore but little fruit, while two trees standing near a young orchard of other native varieties bore full crops. This shows the need of planting other varieties near the Wild Goose for purposes of pollination, especially when it is true that the trees which bore full crops this year have never borne when the other varieties did not blossom. This variety commenced ripening about the first of August, and continued to ripen in succession for three weeks or more.

Ogon—The next to ripen was the Japanese variety called Ogon, which began to ripen about one week after the Wild Goose, and which ripened the whole crop in about ten days. The tree is a vigorous and rather upright grower, which has proved hardy for the last six years, but this was the first year it ripened the fruit, the curculio having taken all the specimens when there was but little fruit set.

The tree would be very productive, probably too much so, if it was not subject to the curculio and rot, and this year without spraying, the curculio would not have done more than to thin the fruit properly, but about the time the fruit began to ripen it was attacked by the rot, and I only picked about six quarts from a tree that had more than a bushel on when full grown.

The fruit is round, of good size, being larger than Wild Goose; of a buff color, the pit small and seperating perfectly. The flesh is course-grained, sweet, but not rich, and of a peculiar flavor which is not agreeable to all persons. It is excellent canned or preserved.

Botan.—Following this came the Botan, a Japan variety, which in color, shape and size, somewhat resembles Lombard. Our tree is productive, but the fruit even more subject to the rot than the Ogon.

The tree ripened not more than two quarts of fruit, the rest rotting on the branches.

The fruit is larger than that of the Ogon, stone somewhat adherent to the flesh. Flesh, yellowish; juicy, rich, sweet, and of excellent flavor.

Quaker.—The next in order of ripening was Quaker, an American variety, which is the largest grown on my grounds and to my judgement, one of the best in quality of the native varieties. The tree is rather spreading in habit and only fairly productive. The fruit somewhat oblong, pit, semi-cling, but was so badly affected by rot that but few matured.

Marianna—The Marianna, which is a very vigorous but unproductive variety, comes about the same season.

The fruit was a little larger and of a little darker color than the Wild Goose, but of a flavor not at all desirable for eating from the tree.

Pottawatamie—The Pottawatamie ripened about the last of August. It is a Chicasaw variety of medium size, good quality; an early bearer, and will overbear, notwithstanding the curculio, if not thinned. I picked off fully half of the fruit when half-grown, leaving plenty on the tree.

It seems to be one of the most promising of the native varieties in this vicinity.

Sucker State—Ripens about the middle of September. Tree a vigorous grower and fairly productive.

Fruit—medium, oblong, clingstone, dark red, with thick skin, and firm flesh; a good keeper and shipper; not fit for dessert, but a good canning plum.

Moreman—This is a little later, and a little lighter in color, but otherwise, resembling the Sucker State, but not nearly as productive.

Langdon—This ripens about with the Pottawatamie, is round, of medium size, dull red color, small stone, cling, of good quality, drops from the tree before fully ripe, and quite subject to the rot.

Miner—This ripens about the middle of September, medium to large in size, dull red color, skin thick, of good quality.

This variety, with Robinson, Forest Rose, Weaver, Newman and Golden Beauty, blossomed freely; set the fruit well, were not injured by the curculio, but before ripening, the fruit ceased to grow, and gradually shriveled upon the tree, so that not more than one-fourth of the fruit on the Miner ripened, and but few specimens on the other varieties.

I have but little doubt this was caused by the plum pockets which badly affected the twigs on a number of the varieties. De Soto, Maqueketa, Rollingstone and Forest Garden produced a few specimens, but most of the fruit rotted before ripening, while Wolf and Woodland trees, six years old, showed but few blossoms and set no fruit.

Early Red, White Nicholas, Russian varieties, blossomed freely but set little fruit, which was all destroyed by the curculio, which also took a few specimens on the Lombard, Coe's Golden Drop, Bradshaw, and Yellow Egg varieties. As these had not enough fruit on to pay for spraying, they did not perfect any fruit.

NEW JERSEY NOTES.

BY AUG. D. SELBY.

The State of New Jersey is most favorably placed in the diversity of plant forms it offers for study.

The indigenous species are exceedingly numerous, including the plants whose range of habitat is represented by the coast marshes, the interior pine barrens and the northern high lands. It has received through commerce as large, if not larger additions of introduced European and foreign plants than any other state, and by reason of the variety of conditions and nearness to market has developed very extensive horticultural interests.

It is known to us as the "Garden State" and this name conveys an idea of the importance of horticulture in New Jersey.

As we are often told, a great variety of the higher plants means a corresponding increase in the number of species of insects and fungi whose existence so largely attaches to that of certain hosts. The natural condition has been emphasized and the number of preying forms both plant and insect greatly augmented by the long continued cultivation of the same crops.

New Jersey, then, is a promising field for the investigator of plant life and plant diseases. An appreciation of this fact has led to the appointment and continuance of so well known a botanist as Dr. Byron D. Halsted in that department of the Experiment Station. The work done in botany by the Station is known and appreciated all over the Union. Circumstances before pointed out have determined to a large extent the character of the work undertaken—plant diseases and weeds are carefully studied. The diseases of the cranberry, the black knot of plum and cherry, the rots of potatoes, particularly of sweet potatoes, the diseases of celery, spinach, melons and other cucurbitaceous plants, the blights of potatoes and tomatoes, the fungi of green house plants, the life period and root systems of our worst weeds and now the fungi of weeds have occupied and are occupying the attention of the Station Botanist.

The natural division of labor among experiment stations has occurred; we turn to the western reports for information upon the rusts and smuts of grains.

To state briefly, results obtained in the investigation of tomato and potato blights and of melon diseases seems to me of value.

The examination of potato blight and of southern tomato blight where the potatoes were likewise affected, led to a series of inoculations from one plant to the other. The results of these inoculations show the substantial identity of the two diseases, both of bacterial origin. Perhaps this was more to be expected because of the close relationship between the potato and the tomato. Nevertheless a demonstration of the connection between the two diseases shows clearly the danger of following one of these crops by the other, where the preceding crop has been blighted.

Leaving this subject to be reverted to later, results on the melon blight may be noticed. This possesses interest in Ohio from the presence of at least one form of the melon disease in the State, at this time. In cases reported upon by Dr. Halsted, similar troubles of melons and cucumbers are shown to be due to the same bacterial disease.

Germs from diseased cucumbers introduced into squash and melon vines or fruit, produced a similar decay to that observed in the original plant. Virus of the disease of the cucumber introduced into the growing stems and green fruits of the tomato, quickly set up a decay similar to that of the cucumber from which the virus was taken. The virus from the cucumber applied to potatoes, produced similar, though less satisfactory results to those obtained by inoculating the tomato. The decaying substance from the potato tuber when taken back to the fruit of the cucumber produced rapid decay.

In summing up the results of the study, Dr. Halsted points out the danger in following any one of these crops, tomatoes, potatoes, melons and cucumbers or squashes by another, in cases where the one has been blighted. Some of these diseases have already appeared in Ohio and although examination there has not yet demonstrated the identity of the disease with that herein mentioned, it will be a safe plan to adhere to the rule given.

Serious troubles of muskmelons in New Jersey have been reported, in which the presence of an anthracnose or a leaf blight (*Phyllosticta*), has been found more or less constant.

Diseased muskmelon vines sent me at two different times from the vicinity of Wooster, by Prof. Webster, showed upon examination the constant presence of the Phyllosticta on the leaves. The presence or absence of bacteria was not determined. The prevalence of the disease is reported such that the other troubles may be sought.

In the absence of definite knowledge on the other points, wisdom would suggest rotation with something besides the plants named above.

NOTES ON BRITISH HORTICULTURE.

BY PROFESSOR WILLIAM R. LAZENBY.

Compared with the United States, there is little fruit grown in England. Outside of a few counties, orchards and fruit gardens worthy of the name are few and far between. I suppose the climate is to a certain extent answerable for this, and yet it is safe to say that the soil and climate of a large part of the country will grow fruit of some sort or other. I am inclined to think that the system of land-tenure has had much to do in the way of checking the development of fruit-culture. Some tenants who have long leases and are practically landlords themselves, have planted large orchards and have found them a source of profit. As a rule, however, the average tenant does not feel justified in planting fruit trees, where there is no definite lease or no guarantee of payment for the increased value imparted to the land. To establish succesfully orchards of the apple, pear, plum and cherry, is to incur no little expense, and the man who simply rents land from year to year does not care to improve the property of others, unless there is some certainty of being paid therefor. If this objection did not exist, I am confident that the large fruits would be more generally grown in the better fruit districts of England.

In regard to the small fruits, difficulties of the kind mentioned are more easily adjusted, and it is not uncommon to find quite large plantations which are cultivated to the mutual satisfaction of both tenant and landlord. There are small-fruit growers in Kent and some other counties who have from 50 to 100 acres planted with strawberries, while others have about half this acreage in raspberries.

THE PARCEL POST.

One interesting feature was the large quantities of fruit, especially the finer samples of small fruit, that are sent to market by parcel post. There are many different forms of packages used for this purpose, some returnable and others non-returnable, being used for one transmission only. While this is somewhat expensive, it is becoming a very popular method of shipping fine dessert fruit. It is an extremely rapid and practical method of conveyance between distant points, and is much cheaper, for small packages, than the express service of the United States. The greatest weight allowed is eleven pounds, and the postage on this is something like 35 cents. For a three-pound package the postage is 12 cents.

When we realize that these packages are conveyed just as rapidly and delivered just as promptly as other matter carried by mail, directly to the person to whom they are addressed, the advantage of this system of shipping in the case of high-priced perishable fruit, is at once apparent.

CURRANTS AND GOOSEBERRIES.

Perhaps the two fruits in which I have been the most interested, and which do unusually well throughout nearly all sections of Great Britain, are the currant and the gooseberry. These fruits, with the exception of the black currant, do well on the light porous soils, or in rather heavy clay loam provided it is well drained.

As with growers in the United States, the currant and gooseberry bushes are propagated from cuttings, started in nursery rows. They are usually transplanted when two years old, and are frequently grown between standard apple, pear or plum trees. One feature of the fruit gardens and orchards of England is the close planting, overcrowding being prevented by severe and systematic pruning. Where currants or gooseberries occupy the whole ground they are generally planted either 5 or 5½ feet apart each way. The black currant, which grows more luxuriantly, is placed 6 feet apart which gives 1,210 plants to the acre.

The price of well-rooted, two-year-old currant or gooseberry plants is about $2 per 100. Some of the newer varieties bring more and poorly grown plants are sometimes sold for less. The management of the currant is somewhat as follows:

The stocks are kept short, and the plants naturally assume a bush form. The ideal shape for a currant bush is that of a cup or bowl. The terminal shoots are cut back to a length varying from 5 to 8 or 9 inches, depending upon the variety and vigor of growth. The laterals are also cut back, the object being to induce the formation of fruit-producing spurs. The ground is kept well-cultivated and is usually dug over by hand, with a three-pronged spud or spading-fork during the winter.

All sorts of refuse are used as manure by currant and gooseberry growers. Old, partially decayed rags or shoddy, or almost any form of organic refuse, is used, and in the vicinity of cities much of this material can be obtained for the hauling.

A fairly good average crop is 4,000 lbs. to the acre, and the price received by the grower varies from 3 to 6 cents a pound. Nearly all the currants I have seen exposed for sale by retailers the present season were marked at from 8 to 12 cents a pound. I should judge that the demand for this fruit is a large and constantly growing one. It is used for making jelly, jam and for canning. It is difficult to find a grower who can give the exact figures of the cost of production. In Southern England the currant is regarded about as profitable as the gooseberry, but in the more northern counties the gooseberry takes the lead. One grower informed me that his expenses for cultivation, including manuring, would average about $50 an acre; all other expenses connected with the crop, picking, packing, marketing, &c., $40 an acre. This, I judge, is a fair average of the cost of growing, which does not, of course, include rental for land or interest on capital invested.

The varieties largely grown are the Imperial Red Dutch, Trainer's Red Grape and Queen Victoria. The latter is one of the largest and finest, and brings a good price in the market.

THE BLACK CURRANT.

Black currants are also largely grown, but are not, as a rule, regarded so profitable a crop as the red varieties. The black currant is a gross feeder, and requires a deep, moist soil. The varieties most largely grown are Black Naples, Baldwin's, Lee's Prolific and Carter's Champion. A very late variety called the Prince of Wales, which has fruit of large size, is also grown to a considerable extent.

In Southern England this fruit seems to suffer from hot weather, the same as it does in the United States. A cool temperature and moist soil are the requisites for success. The fruit is in good demand, and black-currant jam, jelly, lozenges, &c., are found in all the markets. It is reported that the juice of this fruit is quite largely used for the adulteration of wine, but of this I am unable to speak with authority.

THE GOOSEBERRY THE BANNER FRUIT.

The gooseberry is the banner fruit of Great Britain. Here it grows, thrives and attains a perfection I have never yet seen in the United States. It certainly does well in England, and my impression is that, on the whole, it does better in Scotland. When we consider the ease with which the gooseberry is propagated, its easy cultivation, early fruitfulness, and length of life, together with the excellence of its fruit, it is no wonder that large profits and quick returns often follow its cultivation. The gooseberry is usually propagated here by taking, in autumn, straight cuttings about 14 or 15 inches in length, and after removing all the buds except those on the upper third of each cutting, placing them in nursery rows. In two years, when properly cared for, they are ready to plant out.

The most important thing connected with gooseberry-culture is judicious pruning. This work, which cannot be neglected, is done from late autumn to early winter. Many of the vigorous-growing shoots and branches are annually removed, and only a moderate supply of young growing wood is left. The bush is made to assume a cup-shaped top with slightly drooping branches. The cultivation and manuring are like that just described for the currant. As far as I have learned, the varieties of gooseberry in cultivation in Great Britain are far more numerous than the varieties of any other small fruit, and the choice of variety appears to depend to a large degree upon locality. For picking green or for preserving when ripe, the Whitesmith, Early Sulphur and Warrington, appear to be general favorites. Crown Bob, well known in many American gardens, is also a much prized sort, and its large, finely colored fruit sells well in the market. Other varieties largely grown are, Red Rifleman, Golden Drop, Monarch and Lancashire Lad. I believe that Lancashire, one of the northern counties of England, is quite famous for its gooseberries, and usually succeeds in capturing a large portion of the prizes offered for this fruit at horticultural exhibitions. Many new varieties were originated in this county, and the names with which they have been heralded to the world are not unlike those used by our own originators. Among some of the best known I find the following: Roaring Lion, Leveller, Napoleon, Red Champagne, &c. Whinham's Industry is also highly regarded, and is thought to be one of the leading sorts.

I can speak less confidently of the yield of an average crop of gooseberries than I could of that of currants. The greater number of varieties in cultivation, and the fact that more skill is required in pruning, are among the reasons why the "average" crop is variable. Good growers are not satisfied with anything less than a crop of 7,000 pounds an acre. The price received for gooseberries varies greatly. Early fruit of choice varieties, raised in sheltered localities, often brings from 15 to 18 cents a pound. But this is exceptional. Under ordinary circumstances, the price received for the first few pickings is 6 or 8 cents a pound. It soon falls, however, and a fair average price for the whole crop would be 3 or 4 cents a pound.

Gooseberries are bought very largely for canning and preserving, as well as for immediate use as a dessert fruit, or for puddings, tarts, &c. I judge that the expense of raising gooseberries is about the same as that of raising currants—perhaps a little more. It can scarcely fall below $100 an acre.

THE CURRANT WORM.

Both the currant and gooseberry bushes, especially the latter, are subject to attacks from the currant worm or saw-fly (*Nematus*). In order to check the ravages of this insect, quicklime, lime ashes or soot is scattered close around the bushes late in autumn, and dug into the soil. This is said by many to be an effective remedy. Other growers syringe the bushes with soft soap and soda and water.

Sprinkling with powdered hellebore, or using it in solution, is practiced by some, but not nearly so generally as in the United States. Hellebore is regarded just as dangerous a poison as London purple or Paris green, and most growers will not apply it after the fruit is set. When used, the powdered hellebore is generally applied with a soufflet or hand bellows, which useful apparatus costs about 75 cents.

THE STRAWBERRY.

Strawberries in England and Scotland are generally grown upon the loamy soils, and the same plantation continues to bear from three to five, or even six years. The plants are generally set in autumn, and usually follow a potato or some similar crop. The runners are selected directly after the fruit is picked; are then put in a nursery, where they are well cared for until the time of transplanting in autumn. Some large growers set their plants 30 inches apart each way, but the more common method is to plant them 30 by 18 inches. No winter protection is required. Just before the berries begin to ripen, they are mulched with strong farmyard manure, which serves the purpose of stimulating the growth, retaining the moisture, and keeping the fruit clean. The picking is done mainly by boys, and only in early morning, so a large force is required. The fruit is sorted and packed in round baskets or "punnels," by women, and these are put into boxes holding five dozen. The inferior fruit is never packed, but put into tubs and sold to makers of jam. The average price of the fruit to the grower is about 8 cents a pound. The best fruit brings considerably more, the poorer much less. Three thousand pounds an acre is regarded as a fair average crop, but some growers informed me that their yields were not unfrequently 4,000 pounds, and sometimes 5,000 pounds an acre. Only about six or eight varieties are extensively grown.

Although the strawberry specialist is very successful, I was surprised to observe how little attention is given to strawberries in the ordinary farm garden. Often, where the gardens were large and well kept, I looked in vain for a strawberry plant. Occasionally a small bed would be seen, which as a rule, had not been changed for years, and presented a tangled mass of roots and runners. In all the markets that I had the opportunity of visiting during the strawberry season, this fruit seemed to have a ready sale. I am sure that the enterprising horticulturists of America would make more of it if they had the opportunity that is found in some portions of England. The retail price of all good strawberries was from 12 to 16 cents per pound. I judge that the English strawberries will bear transportation twice as far and keep double the time, that they will in the warmer climate of the United States. The season is also much longer.

THE RASPBERRY.

Raspberries are cultivated very much the same as in the United States. The Red Antwerp and Carter's Prolific are the varieties most largely grown. A fair average crop is 3,500 pounds an acre, and the price ranges from 4 to 6 cents a pound. Much of the fruit is used for making jam. The most expensive part of raspberry culture is picking the fruit. It ripens slowly here, and this necessitates looking over the canes many times during the fruiting season. While strawberries are usually picked by boys or men, raspberries are almost always picked by women, who work for small pay. The finer fruit is carefully packed in small baskets and sent to market the same as the strawberries. Instead of the basket, small earthenware crocks are sometimes used. These hold from 7 to 12 pounds, and are preferred by some growers. For soft, juicy fruit they seem to be particularly well adapted.

Where the berries are sold for the purpose of making jam, they are picked into small tin or rather galvanized iron pails, and are then emptied into tubs with lids to them, and are sent to market in this way.

The raspberry season appears to be proportionately longer than the fruiting season of the strawberry. At this writing (Aug. 19) raspberries are still found in abundance in the markets. Before the home-grown strawberries and raspberries of England are ready for use, the large markets are supplied with these fruits from the more southern countries of Europe, especially France.

THE BLACKBERRY.

Blackberries are not cultivated in England. At least they are very rarely found, and then, as a rule, only in private gardens. I have not yet seen them exposed for sale in the markets, and find, upon inquiry, that many dealers do not know what kind of fruit is meant under this name.

PREPARING FRUIT FOR MARKET.

It is a matter of surprise that the British fruit-growers should pay so little attention to the preparation of fruit for market. I was much interested while visiting Covent Garden fruit market, to notice the neat packages and excellent packing of the French fruit-grower. Small, neat packages are the rule, and the fruit certainly looked inviting. In this respect the British horticulturist is behind and he must necessarily suffer when brought in competition with his more progressive neighbor.

OBSERVATIONS ON FOREST INSECTS.

BY PROF. D. S. KELLICOTT.

(Abstract.)

The subject, it seems to me, is one of unusual and general interest. The primitive forests of Ohio have largely disappeared within a century. There are remnants, it is true, which show us the remarkable variety, beauty and grandeur of the forest trees which our soil and climate are capable of producing. Does it often occur to us that the forests were, and are, one considerable factor in determining the character of the climate and the condition of the soil? That their removal disturbs injuriously that balance ot forces which has given this broad State such great advantages in so many directions? I fear not. Still, the institution and observance of "Arbor Day," and the establishment of the "State Forestry Bureau," indicate true and growing interest. These are good omens; both should be directed by intelligent, guiding hands. Their first work is evidently educational, but in the matter of education we should not forget that societies like this have opportunities and duties. I cannot refrain from saying, in this connection, that our Forestry Bureau, which seems, at present, in a state of noxious desuetude, has to-day unusual opportunities to push an educational campaign. This it could do in ways that need not be specified, through Farmers' Institutes, through Arbor Day observances now quite general, Agricultural Experiment Stations, Forestry Chairs in Colleges, and Horticultural Societies. A larger number ought to be led to respect and reverence trees, American trees, to understand that tree planting is but one step in tree cultivation; that they should be cared for, protected from enemies; that there are favorable and unfavorable localities; that if properly cared for in their feeble state, in maturity and strength they may shelter us; and if the "bullion theory" is forever to prevail, there is gold in healthy, perfect, mature forest trees.

The natural enemies of forest trees, those which cannot be kept out by placard, gun, or fence, are fungi and insects. Both of these are unduly concentrated on the cultivated trees and the portions of forest yet remaining. Doubtless it took a very long time to produce the wonderful forests that clothed Ohio a hundred years ago. Thousands fell by the way and yielded their mouldering substance to those most favorably situated and most vigorous. We cannot wait for this slow process of nature; we haven't the centuries to spare; we want a finished product of high grade in the shortest possible time; therefore, each seedling allowed to grow should be given a chance by receiving due care and immunity from enemies.

During the present season I have had an opportunity to study forest insects in different localities in the State and for a few days in central New York. One case in the latter State may be mentioned. Oswego county, N. Y., has been rapidly cleared of forests of late, and in consequence many destructive species are greatly increased on remaining woodlands. The ash, for example, is a very abundant genus, and has been removed in great quantities. I saw hundreds of acres on which scarcely an ash tree was left with foliage. Those standing in the fields were, as a rule, as bare as in winter. The fall-web-worm was the enemy; it is a pretty general feeder, but in that locality seems to have a particular fondness for black and white ash. I was told by interested parties that the ash was often killed by having its leaves stripped as early in the season as my visit, August 20th.

A case of similar import may be cited near home. At Georgesville the prevailing timber is oak and hickory; near the village a considerable area has been cut off in a year or two past; in consequence I found in September a most extraordinary multiplication of oak feeding insects, in particular. Oaks of different species were simply defoliated, especially those that might be called small. I will not attempt at this time a list of the species, but content myself by referring to a few. Perhaps the most abundant species was *Edema albifrons*, which did not by any means confine its attention to oak; the next in order of abundance and destructive power were three species of Anisota, viz.: *A. senatoria*, *A. pellucida* and *A. stigma*. I noticed also the very great number of galls, largely by species of Cynipidæ; these occurred on leaves and twigs, causing death and deformity.

Different species of the genus Datana have been collected about Columbus, and on the whole there seems to be an increase of these defoliators. *D. integerrima*, which defoliated practically every black walnut about the city, I have seen, though not abundantly, everywhere in the State that I have observed. *D. ministra* has been abundant this season on apple and bass-wood principally. *D. contracta*, *D. angusii* and *D. Drexelii* have been taken in moderate numbers.

Through the kindness of Mr. Fischer and Mr. Surface, I have reports and specimens of the bag-worm, which must be on the increase in southwestern Ohio. I have previously reported to the Society finding a bag-worm at Sugar Grove. More material and a discussion of the matter at the late meeting of Entomologists at Rochester, N. Y., convince me that the Sugar Grove specimens belong to a species described (Mss.) by Dr. Harris many years ago, and which has been kicked about a good deal by systematists and finally placed as a synonym of the common *Thyridopteryx ephemæriformis*. If I am correct, our examples will rescue from the limbo a beautiful and interesting species to go again by its original specific name, *T. coniferarum*.

I have at another time reported upon the Aegerian boring in the trunks of mountain ash; I can now add that it seems to be spreading to cultivated ashes (Fraxinus) in Columbus. One tree known to me contains hundreds. The species is *Sciapteron syringæ*, whilst another, *Aegeria corni*, damages the twigs of the maple, and still another, the trunks and branches of oak.

In some localities the beetle larvæ of oak and hickory pruners are abundant, causing the ground to be littered with small twigs as by autumn leaves.

Remedies for twig pruners and many borers are obvious—destroy at the right time twigs and branches; for foliage feeders, the usual means of destruction practiced upon orchards and field crops are the only resort.

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REPORTS OF STANDING COMMITTEES.

REPORT OF THE COMMITTEE ON ENTOMOLOGY.—JULY.

In the absence of the Chairman, Prof. F. M. Webster, Prof. Kellicott reported for the committee as follows:

I. A NEW ENEMY OF THE MAPLE, *Aegeria corni*, Edw.

Both the sugar and silver leafed maples growing on the University Campus and Experiment Station Farm are injured by the well-known maple aegerid, *Aeg. acerni*. Both are also injured by *Aeg. corni*; the former is found in the trunks mainly, the latter mainly in the branches. The infected limb becomes swollen and gnarled by the action of the boring larvæ and the tendency of the growing wood to repair the injury. On cutting into these excrescences, they are found bored in various directions, and decaying. Often several borers are found in one enlargement, The limbs often die beyond the injury, or are thrown down by the wind.

The moth closely resembles *Aeg. acerni*, is smaller, however, and comparison will reveal many points of difference. Both are pretty, clear-winged, wasp-like moths, and may be detected flying about the maples in May, June and July, by the conspicuous *red* tuft of hairs at the end of the body.

Aeg. corni has not before been reported as injurious to the maple, as its preliminary stages have not been heretofore known.

The remedy that occurs practicable is trimming off and burning infected limbs in the fall or early spring. The larva probably gets into the limbs through injury caused by other insects.

II. Brief notice of an aegerid inhabiting galls on the limbs of the swamp oak, *Q. palustris*. All about Columbus, Central College, etc., the swamp oak bears many globular or oblong galls, an inch or more in diameter, made by a cynips fly. From some of these I have found a guest species of *Aegeria* to issue. Indeed there are two guest species in these galls, as you may recall that one, *Aeg. gallivora* was reported last year as occurring at Sugar Grove. The present species appears not to have been described, and I propose to call it *Aegeria rubristigma*, and describe it at length elsewhere. I may say, however, that it is steel blue with a red dot or stigma on each forewing, and with three golden bands on the abdomen, and with golden bands on the blue-black legs. It expands 17mm.

It cannot be called injurious as the galls produced by another insect cause the twigs to die.

III. THE SQUASH BORER AGAIN.

In several former reports the committee has referred to this pest and its remedies. This reference is simply to again call attention to the fact that it is very destructive this season at Columbus, and also that the two forms of larvæ taken by Professor Scudder at Cape Cod, and which indicate that there are two species, are both found here in about equal numbers. They seem to act in a similar manner and possibly may be different stages of the same insect. Whether so or not and whether either or both are single or double brooded I am trying to demonstrate by examples feeding in breeding cages. The two forms may be separated easily; the common one *Melittia ceto*, has the head brown, the top of first ring with two lune shaped brown marks, the anal shield brown and no black points on the skin; the other, unnamed, has the head black, top of first ring black, anal shield black and rows of black dots with a hair arising from each along the sides.*

The most satisfactory remedy as it seems to me is by cutting into affected plants at the place of injury which may be known by excrement pushed through an opening on the stem or by a soft area generally just above the ground, and killing the intruders; then "layering" the stem at a point just beyond the injury.

IV. The black-walnuts and hickories are as thoroughly defoliated as in former years by the larvæ of *Datana integerrima*; scarcely a tree escaping in the vicinity of Columbus. Since they feed in companies and gather on the trunks and limbs in large bunches for moulting they are easily destroyed and if this were thoroughly and generally done for a year or two these beautiful, useful and long suffering trees would be spared. Members of this Society certainly ought to lead the way. Let us not wait for the parasites!

I may say in this connection that another species, *Datana ministra*, has been found recently, doing some damage to apple trees, at Clintonville. The latter has yellow lines on a testaceous colored skin, the former white. Their habits are similar.

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*Since the above was written I have proven that they are but forms of the same species.—D. S. K.

V. It is hardly necessary to state what you doubtless all know that the corn worm, *Heliothis armiger*, is very destructive in the vicinity. One field visited had fully one-third the ears injured; I am told of instances in which nearly every ear is eaten. In former years it has occurred sparingly in early varieties. It will doubtless soon disappear, or at least, not appear in sufficient numbers to cause much damage. It is now, July 30, passing into pupal stage and the danger is past for this year.

VI. In reply to questions by the President, Professsor Kellicott said the fly mentioned was the horn-fly, *Haematobia serrata*; that it resembled the house-fly, but it was smaller and could be distinguished from any other troubling cattle by the angle at which it carried its wings when at rest or feeding; they were held out from the body, whilst in others they were held more nearly parallel to the body.

They do not injure the horn, but may bite the skin about the base, causing the creature to rut against objects and so injure both horn and skin; they appear to be socially resting on the horns.

The remedies found effectual are these: First—Keep the flies off the cattle by spraying two or three times a week with kerosene emulsion, preferably with a small quantity of carbolic acid added. Second—Reduce the number in the pasture by throwing lime on the droppings of the cattle, thus killing the young which breed in this material.

It is probable that after a few years they will be so greatly reduced by natural causes that they will not be more troublesome than our native species. They are certainly sufficiently numerous to cause much annoyance to the cattle and loss of product in this vicinity this year.

SEPTEMBER.

I. Judge D. F. Pugh called attention recently to the fact that in a house, built four or five years ago, inside finish white ash, the base-boards in one room were perforated by some minute insect. The varnished white ash boards proved to be perforated by a small beetle, the larvæ of which were doubtless in the lumber when the house was finished, and this year have completed their period. Similar instances come to notice from time to time.

II. *Empritia stimulea* has been sent in by people anxious to know what it was and if its sting or bite is poisonous or dangerous.

The curious larva has its spines beset with stinging hairs of great energy. It is undoubtedly the most forcible species in this way known to us. One person reports that its sting was almost unbearable for days. The larvæ are or have been abundant this fall, found by me on basswood, oak, hickory, maple, cherry, elm and red bud.

REPORT OF FRUIT COMMITTEE—AUGUST.

BY O. W. ALDRICH.

Mr. President—I desire to call the attention of the Society to some cherries of which I received specimens from Mr. W. N. Irwin, Assistant Pomologist at Washington, who had received them from Oregon, and afterward sent them to me, and they reached me in perfect order.

Along with some other varieties were specimens of the Luelling, which is a black Bigareau of only medium size and of good quality.

Also two varieties called Bing and Horsford, which were the finest cherries I have ever seen. They were similar in color and quality, but the Bing was considerably the larger. This variety was nearly one-half larger than the largest specimens of the Napoleon or Royal Ann cherries from California, which are sold on the fruit stands. They were very dark purple or black, firm flesh, and very rich and sweet. No one would wish to eat a Napoleon after tasting either of these varieties, and their shipping qualities appear, from the fact that they were in perfect condition after having been sent from Oregon to the City of Washington, and remailed to me from that place.

SEPTEMBER.

I desire to report on a new variety of Peach sent out by Lovell's Nursery Company, in 1889, as Japan No. 10, which fruited for the first time, ripening but one specimen.

The fruit is very small, not quite an inch and a quarter in diameter, white skin and flesh, a clingstone with the seed very large in proportion to the size of the fruit.

Not one seedling in ten but would be more desireable to plant than this. I also got one specimen from a graft of Raymond de Montlaur pear which is of medium size; Bosc shaped and of excellent quality; ripening September 15, in this locality, which is considerable earlier than the time given in the catalogues.

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PROCEEDINGS OF THE SOCIETY.

OCTOBER.

The Society met according to notice, Saturday, Oct. 29, President Wilson in the chair.

Mr. G. P. Sperry of Columbus, was elected to membership.

Mr. Selby reported concerning the invitation extended the State Society to meet in Columbus in December, that by request of Dr. Aldrich he extended such invitation in behalf of the Society, and that Toledo had been selected.

Mr. Janney as a special committee reported progress concerning the labors to secure the horticultural works proffered by the late Henry C. Noble.

Mr. Selby of the Committee on Botany called attention to the great attractiveness of our native Winterberry, *Ilex verticillata* which may be found at this time in the swamps near the city, laden with its red berries. Alongside of the Winterberry the Button Bush occurs; both are worthy of cultivation—the latter for summer, the former for late fall as well as summer effect.

Prof. Lazenby reported that he had observed during the month, 32 species of plants in blossom, indicating the occurrence of no killing frosts. The names of the plants were given.

Mr. Selby asked for information as to the occurrence of Gooseberry mildew in the State, also for specimens of the same.

Prof. Lazenby reported on Meteorology. The mean average temperature for the month was 52.6° or 26° above the normal. The temperature of October is very nearly that of the yearly average. Maximum for month 83° on 3rd and 18th; minimum 24° on the 6th. The rainfall was very slight, 0.35 in. as compared with an average of about 2½ inches for the month.

Pres't Wilson called attention to the value of the meteorological predictions and reports, and remarked the care with which farmers examine the predictions of the weather service.

Dr. Aldrich reported upon fruits. He said Strawberry beds had made only a small growth and would require care if kept free from insects and fungi; Pears were badly cracked. The Miner and Golden Beauty plums appear to shrivel and go to ruin; same trouble with Weaver.

In response to a question concerning Moore's Arctic Plum, Dr. Aldrich stated that he had had no experience but that Mr. Hoskins says it is curculio-free and Mr. Schrader that it is valuable and bug-proof.

The Secretary read a letter from the Director of Ohio's Columbian Exhibit requesting copies of JOURNAL to be mailed to Ohio Building during the Exposition and stated that he had agreed to send the JOURNAL.

The regular program was as follows:

Benches for Sub-Irrigation in Greenhouse.—W. S. Turner.

Autumn Appreciations.—E. E. Bogue.

Mr. Janney read a short note on underdraining.

A bill of the Journal-Gazette Printing House, $42, was approved, subject to a correction of $1.75.

The Executive Committee was requested to confer with the Trustees of the University and endeavor to secure the use of some room for a permanent place of meeting.

The Society then adjourned.

NOVEMBER.

The Society met in Botanical Building, Ohio State University, November 26th, Pres't Wilson in the chair.

Mr. J. H. Lageman of Columbus, was elected to membership.

The action of the University Trustees granting the Society the use of a room in the Experiment Station building was reported; it was stated that the room to be occupied is on the second floor.

Prof. Kellerman under call of Botany, reported the collection of upwards of 80 species of Ohio trees for the Chicago Forestry exhibit, but that he had failed to find Red Ash, Green Ash, Red Pine and Gray Pine.

Mr. Janney reported the following additions to the Library:

The California Vine Disease, by N. B. Pierce, 1 pamphlet.

Reports of Spraying Experiments in 1891, by B. T. Galloway, 1 pamphlet.

Report of Missouri Botanical Garden, 1892, 1 volume.

Prof. Kellerman exhibited specimens of a seedless Persimmon obtained from Garrettsville, near Youngstown, O. Many members partook of the specimens presented and shared in the discussion. A good deal of commendation of the native persimmon was indulged.

The regular program was carried out:

Leaf Spots, by Prof. W. A. Kellerman.

Winter Gardening, by Prof. W. J. Green.

Upon motion, R. J. Tussing was named as delegate from the Society to the State Society.

The Society then adjourned.

ANNUAL MEETING—DECEMBER.

The Society met in the room assigned for its use, second floor of Station building, Ohio State University, Saturday, December 31, 1892, and was called to order by Pres't Wilson.

The chairmen of the Standing Committees submitted reports for the year which will be found collected under "The Year's Record". Whenever discussion followed the report, the same is printed in its proper connection.

The Secretary and Treasurer submitted their reports; that of the Secretary was accepted and upon motion the report of the Treasurer was received, subject to verification by the Secretary.

The small amount received by the Secretary during the year $19.00 is accounted for by close collection and some prepayment of dues made in 1891.

It was also stated that in determining the real financial status it is necessary to deduct the amount of the bills presented at this meeting $70.25 from the Treasurer's ledger balance of $134.18.

The following resolution recently passed by the State Horticultural Society at its Toledo meeting was presented by the Secretary and unanimously adopted:

Resolved, That this Society believes that the extermination of the Rose bug would be of great value to the fruit and flower interests of the State, and would recommend that a special appropriation for this purpose be included in the appropriations of the Experiment Station, for the coming year.

In considering the resolution, it was stated that the ordinary arsenical poisons do not destroy this insect and therefore special investigation and field work is greatly needed.

On motion, the retiring President, Mr. J. J. Janney, and the Secretary-elect were appointed a special committee to extend and correct the history of the Society published in 1879, bringing it down to the time when the Society began publishing its Journal, and to print the same together with the act of incorporation in the Society's Proceedings for the year.

The bills of Spahr & Glenn for printing Journal, notices, etc., $42.75, Aug. D. Selby, services as Secretary six months, $25, and Aug. D. Selby, Secretary, postage, $2.50, were allowed and ordered paid.

The Society then proceeded to the election of officers and of chairmen of Standing Committees for 1893, with the following results:

OFFICERS.

President,	John J. Janney.
Vice President,	William R. Lazenby.
Secretary,	Aug. D. Selby.
Treasurer,	Geo. W. Sinks.

Executive Committee, W. J. Green, O. W. Aldrich, Horace Wilson.

CHAIRMEN OF STANDING COMMITTEES.

Botany,	E. E. Bogue.
Vegetable Pathology,	W. A. Kellerman.
Entomology,	D. S. Kellicott.
Fruits,	O. W. Aldrich.
Library,	Thos. F. Hunt.
Meteorology,	William R. Lazenby.
Plants and Flowers,	Albert Knopf.
Vegetables,	R. J. Tussing.

It was stated by the Secretary as previously pointed out in notices of the meeting that all members desiring copies of the JOURNAL for 1891 and 1892 bound together, must send copies of 1891 to the Secretary within a short time.

The Society then adjourned.

AUG. D. SELBY,
Secretary.

THE YEAR'S RECORD.

ADDRESS OF THE RETIRING PRESIDENT.

BY HORACE WILSON.

[ABSTRACT BY THE SECRETARY.]

GENTLEMEN:—I am not quite well to-day, and therefore not entirely sure I shall say just what I wish to. One thing I conceive is unquestioned, and that—that it is an honor to serve as President of the Columbus Horticultural Society. In serving the Society for the past two years, I have endeavored to do what has been in my power to advance the interests of the body.

It has not been without its profit to me, if any question may remain concerning benefit to the Society. There has not been a meeting of the Society which I have attended, that has not paid me ten times over, counted on a cash basis, for time and energy expended. Here are presented the latest and very best things in all departments of horticulture. To me the only cause of regret is the fact that larger and larger numbers do not avail themselves of the excellent opportunities thus afforded.

REPORT OF THE SECRETARY.

The Secretary in reporting upon the past year deems it one of satisfactory progress to the Society. The meetings have been held regularly, were fairly well attended, while the papers and addresses presented, and which appear in our proceedings, have apparently made the desirable gain in value over those of former years.

The active membership has not increased in any marked degree during the year and is now eighty-two. Nineteen dollars for dues, etc., have been collected during the year and turned over to the Treasurer.

As is shown by the Treasurer's report, the financial status of the Society is good. Deducting amount of all unpaid bills, there will remain a balance of about sixty-five dollars.

By the action of the University authorities we again have convenient and desirable quarters, both for meetings and for our library.

The condition of the furniture of the Society and the possession of a very large number of books needing binding, point to these two things as appropriate objects of expenditure.

I would thank the officers and members of the Society for the continued courtesies extended me.

Very respectfully,

AUG. D. SELBY, *Secretary.*

REPORT OF THE TREASURER.

Geo. W. Sinks, Treas., in account with the Columbus Horticultural Society.

RECEIPTS.

1891.		
Dec. 26.	To balance	$179 60
Dec. 31.	Interest on city bonds	12 00
1892.		
Feb. 1.	Interest C. & T. R. R. bonds	175 00
May 14.	Received from Aug. D. Selby, Sec'y	7 78
July 1.	Interest on city bonds	15 00
Aug. 1.	Interest C. & T. R. R. bonds	175 00
Dec. 31.	Interest on city bonds	15 00
Dec. 31.	Received from Aug. D. Selby, Sec'y	11 22
		$590 60
Dec. 31.	To balance	$134 18

EXPENDITURES.

1892.			
Feb. 4.	Paid Aug. D. Selby for postage and stamps	$ 4 29	
	Hanson Bros.' bill	2 90	
			$ 7 19
Feb. 10.	Gazette Printing House		156 80
Apr. 18.	City 6 per cent. bond	100 00	
	Accrued interest	1 80	
			101 80
May 14.	Aug. D. Selby, Sec'y, sundry bills.		
	Garden and Forest	3 00	
	Postage	3 00	
	The Rural Publishing Co.	1 78	
			7 78
Aug. 1.	Spahr & Glenn, bill, April 30, 1892		113 25
Aug. 3.	Aug. D. Selby, Sec'y, services to June, 1892		25 00
Sept. 3.	Hugh Boyd, bill printing		4 35
Nov. 23.	Spahr & Glenn, bill Oct. 1, 1892		40 25
	Balance		134 18
			$590 60

PERMANENT INVESTMENT FUND.

City of Columbus 6 per cent. bonds	$ 500 00
Columbus & Toledo Ry. 7 per cent. first mortgage bonds	5,000 00
Total	$5,500 00

Respectfully submitted,

GEO. W. SINKS, *Treasurer.*

REPORT OF THE COMMITTEE ON BOTANY.

BY AUG. D. SELBY, CHAIRMAN.

In reviewing the results of the year in this department, the Chairman shall not confine himself to botanical labors of the County and State, but consider some of the salient features which seem easily characterized. No recent year has shown such gratifying results to botanical workers. Three features are national in scope.

The preparation of State and National forestry and plant exhibits for the Columbian Exposition has produced unwonted stir in matters thus involved all over the country. This stimulus has been noticeable in Ohio and in this county.

The next point to be noted is the establishment of a section of the American Association for the Advancement of Science, devoted especially to Botany. This was an eminently proper recognition to a large and constantly increasing body of scientific workers, while the action was all the more urgent by reason of the misappropriation of the word "biology" that has made it synonymous with zoology in this country. The A. A. A. S. now has one section of Zoology and one of Botany.

The third and certainly not least important matter of general application was the adoption by the Botanical Club of the American Association of a reasonable code by which our nomenclature is to be shaped. This code, the first three articles of which were subsequently adopted by the Genoa Conference, acknowledges in these articles, "priority of publication" as a fundamental principle; the publication of Linnaæus' *Species Plantarum* in 1753 as the initial date for both genera and species, and the stability of the original specific name where transfer is made from one genus to another, unless it is identical with the generic name or with a specific name previously used in that genus.

Of the Committee on Nomenclature preparing the eight articles of the code, Prof. Kellerman was a member.

Allusion has before been made to the forestry exhibit being prepared under Prof. Kellerman's direction, and there is likewise an exhibit of the native plants of the State in course of preparation under his charge. With the return of these to the university after the close of the Exposition the collections of the botanical museum will be greatly increased.

In County plants a great deal has been done, arising not from the labors of the chairman, who spent the entire summer out of the State, nor alone from members of the committee, but as the combined result of the collections being made for purposes pointed out above and the active participation of an increasing number of volunteer collectors in the county.

In retiring from the Chairmanship of the Committee on Botany after four years of occupation, it seems a proper matter of congratulation that the lapse of so short a time has brought to the study of our county plants such numbers, training and ability as now properly characterize those engaged upon them.

The following collections of new plants and re-collections of those previously reported for the county flora are given with due credit to collectors of new or rare ones. The names of the previously undiscovered species are printed in small capitals and noted by insert numbers to place them in Selby and Craig's Preliminary List of Franklin County Plants, published by the Society in 1890. Some corrections of the previous list are likewise made. The greater part of the re-collections are referred to by number only and may be easily placed in the list above named.

Whether the completed county catalogue will be presented soon must largely depend upon circumstances not now under the control of those engaged upon it.

ADDITIONS TO FRANKLIN COUNTY PLANTS.

108. **Hypericum** ASCYRON, L. Alum Creek Station, Wm. C. Werner.

133*a*. **Ailanthus** GLANDULOSUS, Desf. §. Black Lick, D. S. Kellicott.

412. **Helianthus** GIGANTEUS, L., not *H. grosse-serratus*. Rocky Fork, Aug. D. Selby.

414*a*. **Helianthus** OCCIDENTALIS, Ridd. Georgesville, Werner.

430. **Liatris** CYLINDRACEA, Michx. Georgesville, Selby. No specimens of *L. spicata* have come to hand.

453*a*. **Solidago** ARGUTA, Ait. Rocky Fork, Selby.

466. **Solidago** TENUIFOLIA, Pursh. Columbus, E. M. Wilcox.

497. **Vaccinium** VACILLANS, Sol. North Columbus, E. E. Bogue; Central College, Selby. This plant has been referred to *V. Pennsylvanicum*.

512*a*. **Fraxinus** PUBESCENS, Lam. Scioto River, W. A. Kellerman.

524*a*. **Acerates** VIRIDIFLORA, Ell. Georgesville, Werner.

561*a*. **Ipomea** LACUNOSA, L. Alum Creek, J. H. Lageman.

638*a*. **Monarda** CLINIPODIA, L. Columbus, Werner. Mr. Werner thinks that this is our commonest species about the city.

654*a*. **Stachys aspera**, Mx., var. GLABRA, Gray. Olentangy, Werner.

771. **Thuya** OCCIDENTALIS, L. This tree, which occurs along the Scioto River north of the city, has been referred heretofore to *Chamæcyparis*. Correction by Mr. Werner.

801*a*. **Iris** CRISTATA, Ait. Georgesville, Werner.

975*a*. **Eatonia** DUDLEYI, Vasey. Columbus, Werner.

1062*a*. **Woodsia** OBTUSA, Torr. Scioto River, Werner.

RE-COLLECTIONS.

Nos. 113; 115, Island, Scioto River, Wilcox; 226, by Canal, south of city, Bogue; 249, same place as 226, Wilcox; 432, Georgesville, Werner; 441, ditto; 458, Solidago Ohiensis, Ridd, by Canal, south of city, Wilcox; 460, S. Riddellii, Frank, same locality, Werner; 480, Scioto River, Bogue; 549, 582, 601, 645, 651, 652, 1028.

COLUMBUS, OHIO, December 31, 1892.

REPORT OF COMMITTEE ON ENTOMOLOGY.

BY PROF. D. S. KELLICOTT.

This committee has reported at the regular meetings, on current topics falling within its scope. These reports were rendered by Prof. Webster until his removal from the city in June, since then by the undersigned. Such matters as appeared to possess any permanent or popular interest have been published in the Journal of the Society and need not be referred to on this occasion. It may, however, be said again that the corn-worm was unusually injurious last season, attacking both early and late crops; so far no reports have come to the knowledge of the committee regarding its attacks upon the tomato in this part of the State. In New Jersey it caused great loss in destroying the earliest varieties. Fall plowing is recommended as, at least, a partial prevention, since the pupæ pass the winter a few inches below the surface and are thus turned up and exposed, thereby destroying many.

Two of the committee attended the annual meeting of the Association of Economic Entomologists in Rochester, N. Y., in August, and we can report, as was done last year, that from all quarters there comes evidence of growing confidence in methods proposed; that more and more of those most concerned are acquiring the habit of preventing insect depredations by the efficient means now known and recommended. The more general acquisition of the habit is now the principal thing, for the means of correction are simple, cheap, effectual, at least, in most cases. There are yet many people who look upon a scourge of insects as an affliction of Providence that must be borne with fortitude. It does not appear to be so; surely no more so than the weeds that cumber the ground.

The committee suggest that greater interest would result from the reports from time to time rendered, if members would make it a special care to bring to the meetings any specimens of insects or their work that may occur in their experience in field, orchard or garden.

REPORT ON METEOROLOGY.

BY PROF. WILLIAM R. LAZENBY, CHAIRMAN.

JANUARY. Mean temperature 23°; highest temperature 55° on the 1st; lowest temperature—18° on the 20th; range of temperature for month 73°; mean daily range 17°; greatest daily range 34° on the 20th; least daily range 5° on the 5th.

Ten days were cloudy, 12 days were fair, and 9 were clear. Rain or snow fell upon 11 different days. Total rainfall for month, including melted snow, 2.05 inches. Prevailing direction of wind, S. W.

The lowest temperature of the year—18° was recorded the 20th of this month. The mean temperature was 3° lower than the normal for January.

FEBRUARY. Mean temperature 35°; highest temperature 62° on the 24th; lowest temperature zero (0) on the 6th; range of temperature for month 62°; mean daily range 17°; greatest daily range 37° on the 6th; least daily range 4° on the 3d. Fifteen days were cloudy, 8 days were fair, and 6 were clear. Rain or snow fell upon 11 different days. Total rainfall for month, including melted snow, 3.27 inches. Prevailing direction of wind, S. The mean temperature was 4° above the normal for February.

MARCH. Mean temperature 35°; highest temperature 65° on the 26th; lowest temperature 13° on the 10th, 11th and 13th; range for month 52°; mean daily range 18°; greatest daily range 35° on the 25th; least daily range 7° on the 18th.

Eleven days were cloudy, 11 days were fair, and 9 were clear. Rain or snow fell upon 14 different days. Total rainfall for month, including melted snow, 2.16 inches. Prevailing direction of wind, N.

APRIL. Mean temperature 50°; highest temperature 78° on the 1st and 5th; lowest temperature 22° on the 9th; range of temperature for month 56°; mean daily range 21°; greatest daily range 36° on the 1st; least daily range 10° on the 8th and 20th.

Nine days were cloudy, 13 days were fair, and 8 were clear. Rain or snow fell upon 12 different days. Total rainfall for month, including melted snow, 2.63 inches. Prevailing direction of the wind, N. E.

MAY. Mean temperature 60°; highest temperature 86° on the 31st; lowest temperature 35° on the 8th; range of temperature for month 51°; mean daily range 20°; greatest daily range 32° on the 1st and 9th; least daily range 10° on the 4th and 19th.

Eleven days were cloudy, 12 days were fair, and 8 were clear. Rain fell upon 17 different days. Total rainfall for month, 4.63 inches. Prevailing direction of wind, S.

The most important meteorological feature of the month was the unusually large number of rainy days.

JUNE. Mean temperature 73°; highest temperature 92° on the 16th; lowest temperature 54° on the 26th; range of temperature for month 38°; mean daily range 19°; greatest daily range 28° on the 13th; least daily range 10° on the 18th.

Four days were cloudy, 21 days were fair, and 5 were clear. Rain fell upon 16 different days. Total rainfall for month, 6.73 inches. Prevailing direction of wind was S.

The most remarkable feature of the month was the excessive rainfall, being nearly 3 inches above the normal for June. The mean temperature was three degrees above the normal.

JULY. Mean temperature 73°; highest temperature 95° on the 24th; lowest temperature 47° on the 2d; range of temperature for month 48°; mean daily range 21°; greatest daily range 30° on the 2d and 17th; least daily range 5° on the 30th.

Two days were cloudy, 20 days were fair, and 9 were clear. Rain fell upon 8 different days. Total rainfall for month, 3.13 inches. Prevailing direction of wind was S. W.

The unusually small number of cloudy days was a remarkable feature of this month.

AUGUST. Mean temperature 71°; highest temperature 90° on the 8th and 9th; lowest temperature 48° on the 31st; range of temperature for month 42°; mean daily range 22°; greatest daily range 32° on the 16th; least daily range 11° on the 1st and 9th.

Two days were cloudy, 20 days were fair, and 9 were clear. Rain fell upon 9 different days. Total rainfall for month, 6.15 inches. Prevailing direction of the wind was N.

The rainfall was almost double the normal for August.

SEPTEMBER. Mean temperature 63°; highest temperature 86° on the 10th; lowest temperature 34° on the 27; range of temperature for month 52°; mean daily range 27°; greatest daily range 40° on the 3d; least daily range 12° on the 13th and 21st.

Two days were cloudy, 11 days were fair, and 17 were clear. Rain fell upon 5 different days. Total rainfall for month, 1.27 inches. Prevailing direction of wind was N.

The rainfall was considerably less than one-half the normal amount for September. This lack of moisture interfered seriously with wheat seeding throughout the central portion of the State.

OCTOBER. Mean temperature 52°; highest temperature 83° on the 1st, 3d and 18th; lowest temperature 22° on the 30th; range of temperature for month 61°; mean daily range 29°; greatest daily range 44° on he 14th and 18th; least daily range 11° on the 25th.

Four days were cloudy, 13 days were fair, and 14 were clear. Rain fell upon 3 different days. Total rainfall for month, .67 of an inch. Prevailing direction of wind was N. W.

The rainfall was considerably less than one-third of the normal for October. This, together with the small rainfall in September, caused an autumn of drought of unusual severity.

NOVEMBER. Mean temperature 37°; highest temperature 69° on the 17th; lowest temperature 8° on the 20th; range of temperature for month 46°; mean daily range 16°; greatest daily range 34° on the 13th; least daily range 5° on the 28th.

Eight days were cloudy, 13 days were fair, and 11 were clear. Rain or snow fell upon 12 different days. Total rainfall for month, including melted snow, 2.62 inches. Prevailing direction of wind was S. W.

The mean temperature was 3° lower than the normal for November.

DECEMBER. Mean temperature 29°; highest temperature 64° on the 7th; lowest temperature 0° (zero) on the 26th; range of temperature for month 64°; mean daily range 14°; greatest daily range 29° on the 2d; least daily range 4° on the 14th.

Ten days were cloudy, 16 days were fair, and 9 were clear. Rain or snow fell upon 7 different days. Total rainfall for month, including melted snow, 1.85 inches. Prevailing direction of wind was W.

As in November the mean temperature was 3° lower than the normal for December.

Summary of year 1892. Mean temperature 50°; highest temperature 95° on the 24th of July; lowest temperature—18° on the 20th of January; range of temperature for year 113°; mean daily range 20°; greatest daily range 44°; least daily range 4°. 88 days were cloudy, 170 days were fair, and 107 were clear.

Total rainfall for the year, including melted snow, 37.16 inches, which is more than 2 inches below the normal.

The total rainfall for September, October, November and December was only 6.41 inches. The normal amount for these four months is 11.21 inches.

REPORT OF THE COMMITTEE ON VEGETABLES.

BY R. J. TUSSING, CHAIRMAN.

In spite of the wet, cold spring and the exceedingly dry fall, vegetable growers have been fairly compensated for their labor.

Early cabbage was plenty and very low in price; the price continued low throughout the season. But owing to the drouth, late cabbage was almost an entire failure.

There is but very little celery grown in this county, as we cannot compete with the Kalamazoo celery, but we can beat them in quality.

The Nutmeg melon crop was good and brought fair prices. I tried the Columbus melon introduced by Livingston's Sons. It has no special qualities that I can recommend; it being too late for this market. The onion crop was light in yield, as the drought caught them before they were matured. The wholesale price ranged from seventy cents to one dollar per bushel. I transplanted about 25,000 of the Prizetaker last spring and harvested 114 bushels from them. I sowed some Globe Danvers seed by the side of them and I did not get one bushel of Danvers where I got three of the Prizetakers that were transplanted. I am still of the opinion that farmers should adopt this plan of growing onions, where they grow for the family use, at least, as they are more easily cultivated and the onions are much sweeter.

Tomatoes brought good prices the fore part of the season. I see by my book that I received $4 per bushel for the first ones, which was on June 29th, and $2.25 per bushel on July 23d, after which the price dropped to 25 and 40 cents per bushel.

The past month has been a very poor one to force vegetables under glass, as we have had scarcely any sunshine. It is almost impossible to grow lettuce successfully under glass in cloudy weather.

As I grow only a few varieties of vegetables, I am unable to give you any light upon the new varieties introduced the past season. Therefore I would suggest that you elect some one chairman on the Committee of Vegetables who experiments with the same more than I do.

EDITOR'S TABLE.

In closing the year the Editor congratulates the Society upon its continued success and widening field of usefulness. The papers appearing in the proceedings for the year sufficiently set forth the works that are done.

* * *

As has been pointed out in the Secretary's minutes of business, the Society will hereafter meet in the Station Building, Ohio State University, second floor. The room is a very pleasant one and offers opportunities as to papers and library which may be realized with due exertion.

* * *

That we are to have a new catalogue of Ohio Plants in the forthcoming volume of the *State Geologist* is a source of anticipated pleasure to allbotanists of the State. Prof. Kellerman and Mr. Werner are sure to furnish a realization of our fullest expectation in regard to it. This is to be a cata logue of fungi and lichens as well as of flowering plants, ferns and mosses.

Two papers in this number relating to greenhouse methods and growths deserve special mention. Anyone who has followed the results on the subirrigated benches of the University greenhouses has had sufficient evidence without further comment upon Mr. Turner's paper. Prof. Green's discussion of "Winter Gardening" presents the practical business features connected with market and prices. No successful grower can neglect these matters.

* * *

The following are the Standing Committees for 1893, so far as they can be learned at present:

Botany—E. E. Bogue, Chairman; Wm. C. Werner, E. M. Wilcox.

Vegetable Pathology—Prof. W. A. Kellerman, Chairman; Freda Detmers, Aug. D. Selby.

Entomology—Prof. D. S. Kellicott, Chairman; J. S. Hine, Prof. L. H. McFadden.

Fruits—Dr. O. W. Aldrich, Chairman; W. J. Green.

Library—Prof. Thos. F. Hunt, Librarian; W. S. Turner.

Meteorology—Prof. Wm. R. Lazenby, Chairman.

Plants and Flowers—Albert Knopf, Chairman; W. C. Werner, J. H. Lageman.

Vegetables—R. J. Tussing, Chairman; W. S. Turner.

COMMUNICATIONS AND DISCUSSIONS.

SUB-IRRIGATING BENCHES IN THE GREENHOUSE.

BY W. S. TURNER.

In considering the subject of sub-irrigation in the plant house there are a great many obstacles that present themselves. The, first thing, almost, is the thought that the bottoms of the benches should be watertight or nearly so, corresponding to a good subsoil in the open ground. It is well known that ordinary wooden benches will not last much over four years, but if a water-tight bottom must be placed in at so much more trouble and expense, why cannot benches be made permanent? I think the idea is worthy of much thought and experiment. I hear that such benches are made, but have never seen them. Iron supports are used at the insane asylum in this city, and Mr. Pullenger says he contemplates making permanent benches of iron and slate next season. Mr. Green thinks of putting in iron supports and tile for bottom and sides to some of their benches in the greenhouses at Wooster, with ordinary benches for comparison.

In our work we have only ventured on iron supports in one house and oak and cedar in the other. We constructed our sub-irrigating benches by using clear, hard wood flooring, Georgia pine or oak, running white lead into the grooves as the boards were laid. The lead should be quite thick, about like thick molasses, running slowly and not spattering much. We used quarter rounds for corners, laid in lead also. The comparative cost may be estimated as follows:

	SUB-IRRIGATED.		COMMON.
Supports			
1,000 sq. ft. lumber	$24 00		$20 00
White lead, 100 lbs.—7 cts	7 00		
4½ days' work—$2.50 per day	10 25	1½ days' work	3 50
Tile for watering—500 ft	5 00		
	$46 25		$23 50

the sub-irrigating benches costing nearly twice as much as ordinary benches. The cost of tile and laying may be partially or entirely offset by the longer time taken in sprinkling the ordinary bench above that of letting the water simply run into the tile.

The laying of the irrigating tile or pipe is quite a problem, if the pipes or tile are to be placed in lengthwise of the beds and long runs of the water are required. It may be seen that, for equal distribution, the water must not run out too freely at first, nor be carried too much to the further end. So the benches must be made nearly or quite level. By laying the tile in cement on the bottom and partly up the side of the joints, so that when the water is run it may pass the whole length of the pipe before much runs out, as the water rises it will run out at all the joints at once. In using iron pipes the holes may be drilled in straight lines and the pipe laid so that the holes will be on the sides of the pipe and act in the same way. We have found it impossible to secure small enough tile. Two-inch horse-shoe tile is what we desired, but we have had to use three-inch common, which necessitates a deeper soil for benches than is necessary.

The possibilities of sub-irrigating benches lasting longer than common ones are very favorable. Dressed lumber is used, which may be thoroughly painted; then with a coating of cement-wash to preserve the paint, we would suppose the benches should last at least five or six years. I still think that the advantages to growing crops and germinating seeds will more than compensate for the extra expense. What experiments we have tried are very favorable, indeed, to sub-irrigation. Three lettuce crops last season ranged from thirty per cent. to fifty per cent. heavier than by ordinary watering. Radishes were at least a week earlier, that is, the bench could be cleared on the sub-irrigated by the time the others were large enough to market. Tomatoes did not show quite so marked a difference, but the crop averaged about fifteen per cent. more.

The application of sub-irrigation to germinating seeds and to plants while growing in the plats is very striking in its effects. In germinating and growing lettuce, parsley and cauliflower plants, I watered entirely by setting the plats into an old sorghum evaporator containing about an inch or so of water, and letting them remain until thoroughly saturated, then set them out and replaced by others. The one watering would last from three to six days, according to weather; three days in the dryest of weather; so the plants required but little attention. In the ordinary sprinkling it would have been next to impossible to keep all the flats equally moist and growing well by watering every day through dry weather. It does not disturb the surface of the plat (damaging plants and washing out seeds) as sprinkling does; in short, *sub-irrigation is the way to distribute water evenly to germinating seeds and growing plants.* I would very much like to see it applied to a propagating bench.

In constructing our benches, one end of the center bench was reserved as a water bench for young plants, and a bench underneath the side bench was made for germinating seeds.

There is considerable opportunity for change of moisture in the air of the greenhouse by using sub-irrigation. I have been told by experienced men that plants would all wither and dry up if the air was so dry. But to offset that, the dry air is considered very unfavorable to the growth of fungus diseases, at least, to most of them. And it is quite a question with me whether all plants require a moist atmosphere for their best development. Here is quite a field for investigation. At some future time I will be able to give more results as to benches and sub-irrigation.

W. J. Green said in comment: "It seems to me that this is one of the greatest advances recently made in Horticulture. Mr. Turner's young lettuce plants grown in the fall are the finest I have ever seen, for usually there is great difficulty in securing good germination of lettuce seed in the fall. Last year the cost of one sub-irrigated bed 15 x 7 feet was paid in a single crop. By this means the lettuce crop in the greenhouse may be doubled."

Prof. Lazenby thought other applications might also be made of the sub-irrigating tiles. "Why not supply the plants with nutrient solutions in this way? Is it not something to be used out of doors for intensive culture?"

Mr. Green said, there are two things further to be noted in this connection, viz., the moisture in the air is much reduced in case of sub-irrigation, which is against the claim often made that excessive moisture is beneficial. We have thus shown that lettuce does not need the amount of moisture in the air that is claimed for it. The dogma that drainage is everywhere needed is also apparently violated by the sub-irrigation practice, as presented.

AUTUMN APPRECIATIONS.

BY E. E. BOGUE.

"Bacchus, the god, again is here,
And leads along the blushing year."

If we should ask one hundred cultured persons what season of the year they liked best, in all probability at least seventy-five of them would reply, "I like the budding springtime." Some of a more languid nature might say, "Give me perpetual summer, with all the verdure of trees and the fragrance of flowers." A few in robust health and fond of dog and gun would respond, "We prefer the clear, cold winter, with all its ice and snow;" while some, perhaps not a few, would answer, "I like the pleasant fruitful autumn, when nuts come rustling down." The number on the side of the latter would undoubtedly be increased if they only understood what a store of wealth the autumn contains.

Many suppose that the buds spring into being in a few weeks, while the fact is that these buds of early spring began to be formed as soon as the leaf of the previous season began to unfold, and were fully developed when the leaf fell.

Nature has filled her storehouse when autumn comes. The plants have deposited the elements for the reproduction of the species, and also the food for the growth of the next crop of leaves. She has not done the work in a day nor in a week, but has taken all the time since the leaves began to unfold in the spring until they fell to Mother Earth in the fall.

The leaf and stem have served the purpose of protection through all this time. If we examine a twig of the common sycamore, *Platanus occidentalis*, we shall see that the base of the petiole covers the bud entirely, and notice how well the leaf, although large, hangs on the twig.

Notice, too, how well the buds of the apple twig are protected by the petiole of the leaf. Now let us see what it is that nature has taken so much pains to protect.

Most of our shrubs and trees have buds with scales covering the tiny leaves and flower buds inside. The scales act as a defense against sudden changes of temperature to the bud proper, just as a mulch does to plants on the ground.

If we cut the flowering bud of the buckeye, hickory or red maple through the center, we shall see the parts of the flower already there, proving beyond a doubt that they were formed during the preceding summer and will lay dormant through the long winter months waiting for the revivifying influence of spring. Probably no plant shows this better than *Cornus florida*, or flowering dogwood.

So we conclude that when we observe the leaves falling from the trees, we must recognize the repose into which the tree is passing, and that it already bears the germ of the future.

Lo! on each seed, within its slender rind,
Life's golden threads in endless circles wind;
Grain within grain successive harvests dwell,
And boundless forests slumber in a shell.
—*Dr. Darwin.*

If we look at bulbs, corms and tubers we see the same principle.

The bulb of the hyacinth or narcissus, although it may be hard and dry, has within it the leaves and flowers of a complete plant in miniature. If we cut one of these through the center we can see the parts plainly.

There are, however, other things than these to be considered in connection with our autumnal delights and sober reflections.

The autumn foliage displays gay colors on a grand scale to the delight of every beholder. Many a poet has been inspired to song by the environments of a golden autumn day.

In the October number of Scribner's 1890 Magazine, Duncan Campbell Scott writes:

Sing me a song of the autumn clear.
With the mellow days and the ruddy eves;
Sing me a song of the ending year,
With the piled up sheaves.

Sing me a song of the apple-bowers,
Of the great grapes the vine-field yields,
Of the ripe peaches bright as flowers,
And the rich hop-fields.

Sing me a song of the fallen mast,
Of the sharp odor the pomace sheds,
Of the purple beets left last
In the garden beds.

Sing me a song of the toiling bees,
Of the long flight and the honey won,
Of the white hives under the apple trees,
In the hazy sun.

Sing me a song of the thyme and the sage,
Of sweet marjoram in the garden gray,
Where goes my love Armitage,
Pulling the summer savory.

Sing me a song of the red deep,
The long glow the sun leaves;
Of the swallows taking a last sleep
In the barn eaves.

Mr. Selby said that it may be an extension of Mr. Bogue's "appreciations" to consider the observed fact of the re-absorption of the protoplasmic contents of the leaf parenchyma, occurring at the close of the season before the leaves fall. This protoplasm is stored in reservoirs of reserve materials for use the succeeding season, and only a very small amount of it goes down to destruction with the leaf.

President Wilson said that autumn always brings to him recollections of the cider, walnuts, hot poker, and chat of Revolutionary War, that used to be the expression of autumn appreciation in his youth.

UNDERDRAINING.

BY J. J. JANNEY.

In the year 1828 or 1829 I assisted in ditching a meadow. We dug a main ditch about eighty rods long through the lowest part. There were numerous places along the sides of the meadow at which there were open springs, or small swamps which produced nothing but coarse swamp grasses. We sounded the swamp with a spade until we found the softest spot, and to that dug a ditch from the main one. We then gathered the loose stones from the fields of the farm, of which there was a super-abundance, and threw them into the ditches, 'till twelve or fifteen inches deep, and covered them with earth. The stones were nearly all flint, three to six or eight inches in diameter. We planted the meadow in corn the next year and found the spots which had been too wet for cultivation of any sort, as dry as any part of the ground; I walked over it two months ago, and I found those "blind" ditches still serving their purpose as well as they did sixty years ago.

WINTER GARDENING.

BY W. J. GREEN.

The term winter gardening, although more comprehensive, is usedhere to apply only to vegetable forcing in greenhouses.

This may be called an infant industry, although it has been carried on quite extensively in some of the Eastern States, and lettuce forcing is a considerable industry at Grand Rapids and Toledo. Outside the sections named vegetable forcing is practiced to a very limited extent indeed, in greenhouses. Hot beds are operated near all cities and towns, by gardeners, but this antiquated, crude and unsatisfactory method is giving way very slowly to the more modern greenhouse.

Hot beds do very well for late winter and spring use, but are not adapted to continuous winter work. They entail a great amount of labor in handling material, and of necessity their use is limited by the quantity of heating material to be obtained. These limitations place hot beds out of the question if winter gardening is to be carried on extensively and profitably. All will agree it is desirable for gardeners to so plan operations that work may be carried on the year round.

Help may be employed more advantageously and economically. Teams and equipment can also be kept busy during the entire year more profitably than in summer only.

In view of these facts it seems surprising that gardeners do not abandon their hot beds and construct greenhouses; it is rather amazing also that more do not give up summer gardening almost wholly, and follow the more profitable winter gardening. Old fogyism is often assigned as the reason why gardeners are so slow to change their plans. This charge is often justly made, but in the present case it does not offer a sufficient explanation.

There are two good reasons why careful business men have hesitated before investing in this business.

First—The prices of winter vegetables in our markets, and the quantities that can be disposed of offer no encouragement. Those who have attempted to follow eastern methods have met with small success. We cannot force head lettuce as is done in eastern cities, for the price at which it sells here will not justify it. For the same reason we cannot follow the eastern plan of forcing cucumbers and tomatoes in midwinter. Eastern methods have been tried here sufficiently to show that they are not applicable here.

Second—The direct communication which we have with the South enables gardeners in that section to undersell us in our own markets in winter and early spring.

This fact has, no doubt, deterred many from entering the business. Now that the principal objections to winter gardening, as a business, have been fairly stated, let us see how far they hold good. Nothing need be said about the old fogies. No good ever came of preaching against fogyism. If one does not wish to become a pessimist himself he must not waste his energies upon non-progressive people. Progressive people alone are benefitted directly by advice, and the good which the other class receives comes by reflection, or unconscious absorption.

The introduction of the Grand Rapids lettuce marks an era in winter gardening. It may seem somewhat fanciful to rate the introduction of a variety of so great importance as this, but such was true of the Concord grapes, White Plane celery, and to some extent of many other varieties.

Before the Grand Rapids lettuce was known almost nothing had been done, except in the East, in forcing lettuce in greenhouses, and it is not far from the truth to say that it was not possible to make the business pay outside of the largest cities with the varieties then known.

The Grand Rapids may be planted closer, matures more quickly, and is less subject to disease than the head varieties, hence can be produced for about one-half the cost per pound. Many tons of it are annually grown at Grand Rapids and Toledo, and the business is capable of profitable extension. It will be extended as fast as progressive gardeners learn the facts.

Sub irrigation is another step forward, as by this means the crop may be nearly doubled. It thus appears that we are on quite as good footing so far as lettuce is concerned as the eastern gardeners.

We cannot profitably grow cucumbers and tomatoes in midwinter, but if we devote our greenhouse space to lettuce in early winter and hold the cucumbers and tomatoes back until spring and early summer the result is very satisfactory.

So far as tomatoes are concerned they are found to yield about as good returns per pound, and much better in the aggregate when grown as a spring greenhouse crop as in midwinter.

In one crop we may follow the eastern practice; viz: mushrooms. These appear to bring about the same prices here as in the East, and may be grown any time during the winter with profit. There is probably no crop that offers greater inducement to the commercial grower at present than this. It occupies space not needed by other crops, and does not suffer from southern competition.

There are other crops which may be forced with more or less profit, but as they are of minor importance they need not be named. Of what utility are new and improved varieties and better methods if we must still suffer from southern competition? This is a fair question and must be answered. It must be admitted at the outset that southern vegetables are sold in the markets all over the middle states at prices below cost of production in greenhouses. Where then is the opportunity for northern gardeners? The opportunity lies in the fact that home-grown produce sells for better prices than shipped stuff. Southern vegetables are a week or more on the road from grower to consumer, and seldom reach the latter in a prime condition, hence cannot compete except at reduced prices.

The home-grown product has the advantage in quality, and yet it must be admitted that the competition is often almost ruinous to both the southern and northern growers. The northern grower has the advantage of a home market, and this offsets the advantage of cheap production. Were it not for the change in conditions in favor of the northern grower, already referred to, he could not possibly compete with the southern grower, even with the advantage of a home market, but as matters now stand the outlook for home production of winter vegetables is much better than it is generally supposed to be.

There is usually some compensation, even in adverse circumstances. In this case it lies in the fact that southern produce in seeking a market has opened up new avenues of trade, and educated the tastes of the people. With increase in consumption there is a natural improvement in discrimination as to quality, and this reacts in favor of the home grower.

Wilson and Crescent strawberries at five cents a quart have made a thousand times more consumers of berries than did Jucunda at twenty-five cents. It is true that people do not discriminate as to quality in berries, even after long experience in eating them, but they do as regards appearance.

Our markets are flooded with Kentucky and Tennessee berries just as our own are beginning to ripen, but fresh berries from fields close at hand seem to be in just as great demand as though the markets were bare.

Possibly we suffer a little from southern competition, but we find compensation here also in increased consumption, and better appreciation of our own production.

It is not intended in this paper to convey the idea that a fortune awaits anyone who embarks in the business of forcing vegetables. On the contrary, it is about as precarious as most other kinds of business, and nothing short of good management will make it pay. It does, however, offer good inducements, and is a business that ought to be encouraged, for the reason that whatever is done in this direction is just that much added to home production. In other words, the growth of this business means the development of our resources.

The main object had in view in preparing this paper was to show that conditions now exist which never existed before, and that these conditions favor the building up of a business which in a short time may come to have great commercial importance.

LEAF SPOTS.

BY W. A. KELLERMAN, PH. D.

The "leaf spots" here referred to are only the dead patches, or limited areas of dried tissue of the otherwise green leaves, which have been caused by the attacks of parasitic fungi. They are very often circular in outline and are sometimes rendered still more conspicuous by a raised and often deeply colored border. At times the dead patches or spots are limited by the veinlets and are therefore angular. Or they may have a very irregular outline, involving adjacent tissues on both sides of even large veins. Sometimes the margin of the leaf or the portions near the margin only, become involved.

A leaf may have very few of the spots; again the area of the dead tissue may be great; in fact the entire leaf may eventually be destroyed. In some cases the dead tissue drops out, leaving the leaf full of small holes—giving rise to the name "shot-hole" fungus for the parasite that causes the same. For this case an illustrative specimen is here placed before you. The numerous other specimens illustrate for the most part the various statements made above.

The attacks of insects often deaden portions of the tissue of a leaf, but such spots should not be confused with "leaf spots"—which latter word as you see has a technical meaning. Those injuries can be, with the aid of a pocket lens—sometimes by close inspection even without a magnifying glass—easily identified as insect work.

When the leaf is mined through, the loosened epidermis usually remains intact. If a larva has developed within the tissue, this itself may be found, and therefore be understood as the cause of the injury to the leaf cells. The larva, or transformed insect, may have left the leaf, but the orifice through the epidermis and the previous hiding place may easily be detected.

It is not to be denied that fungi may be associated with such insect injuries, but they are, perhaps, always saprophytic rather than parasitic, that is, they attack the tissue already dying or dead. They cannot, therefore, be the first cause of the spot on the leaf. In some cases, it must be admitted, the amateur investigator may be in doubt as to whether insect or fungi were the agents of destruction, even after the most careful examination has been made. Yet after a very little practice few mistakes will be made.

Other than so-called "leaf spot" fungi may cause a discoloration and final deadening of limited areas of leaf tissue. For example, the coal black fungus sometimes seen on the maple leaf (called *Rhytisma*) should not be considered a member of this group. Another example, better known to you all, is the effect of the Peronospora, or grapeleaf mildew. The yellowish spots of dying tissue are often conspicuous, yet after all they are characteristic and need not be confused as the real "leaf-spots."

It has been said that the spots referred to are caused by parasitic fungi. A word may perhaps profitably be added relative to the development of these organisms, so that the exact nature of the injuries may be understood.

The *spores*—or less properly, though perhaps more significantly speaking, the *seeds*—in some cases find lodgement on the surface of the leaf. They are not only very delicate, but also extremely minute and a tiny drop of water will afford sufficient moisture for their germination. This takes place by the protrusion of a slender tube that bores through the epidermis and thus gains entrance into the interior of the leaf. Nourishment is then absorbed from the food in the leaf cells, in consequence of which farther growth and development takes place. During this, its early vegetative stage, little or no perceptible damage to the leaf is manifest. Gradually, however, the effect will become noticeable.

When the instinctive tendency of the fungus parasite to produce fruit, that is *spores* (for the continuance of the species) begins to manifest itself, it will be found—if proper examination is made with the compound microscope—that the threads or tubes (*hyphæ*), which constitute the parasitic organism, have become very abundant at certain points. From these erect branches may grow and protrude through the epidermis; on these the minute spores are borne. At this time the leaf spots may in many cases present a whitish-velvety appearance; or with the aid of a pocket lens little tufts of erect hyphæ may be seen.

But in other species, instead of these protruding tufts of delicate spore-bearing threads, minute black bodies, round or hemispherical, appear just under the epidermis or protruding through it. These are a sort of *perithecium* or spore-cavity and myriads of tiny spores, *alias* seeds, are contained therein. They escape through fissures or through an orifice that pierces the apex.

In the former class are placed such genera of fungi as *Cercospora* and *Ramularia*, each with hosts of species. Perhaps one-half of the leaf-spot fungi belong to these genera. The leaf-spot fungus of the beet, for example, is a Cercospora, and that of the strawberry leaf a Ramularia.

In the other class the largest genera are *Phyllosticta* and *Septoria*. The spores are here borne in the black perithecia. These bodies are usualy large and conspicuous enough to be seen by close inspection even without a lens. They appear as minute black points or pustules scattered over the dead spot. These two genera, like the two preceding, are separated from each other mainly by a difference in the shape of the spores or other minute characters that need not be dwelt upon here.

I would say finally that we as yet know little as to the best methods of prevention of these pests. Spraying with a fungicide, which may be at the same time an insecticide, will doubtless kill many of the spores that may be resting on the leaf, or in the act of germinating and boring into the epidermis. Delicate as the spores are, some of them may live through the winter, especially those protected by perithecia. Hence this precautionary measure may be taken—namely, collecting and burning affected leaves when they fall from the plants in autumn.

PROMISING NEW FRUITS.

BY O. W. ALDRICH, CHAIRMAN FRUIT COMMITTEE.

APPLES.

Downing's Winter Maiden's Blush.—Offered by E. M. Buechley of Greenville, O. Grown from seed by Jason Downing of Darke county, O., in 1874. In size and appearance very similar to Maiden's Blush, but ripening from December to April. Tree said to be a good grower and an annual bearer.

PEACHES.

Lawrence.—A late peach ripening in Belmont county, O., about the middle of October; described as a large, medium yellow freestone peach, equal in quality to the average of late peaches. Said by Mr. O. W. Reid of Bridgeport, O., to have borne full crops every year for the last four seasons when other trees have borne but one crop.

World's Fair.—From Bollinger county, Mo. Large, roundish, deep red in sun on yellow ground; juicy and of excellent flavor; ripening at its native home from the 15th to the 25th of June.

PEARS.

Elwanger & Barry, the well-known nursery men of Rochester, N. Y., have a new seedling which in size, shape and flavor resembles Anjou with the high color of Clairjean. Tree a vigorous grower.

Seneca.—Offered by William Parry of Parry, N. J. Tree a vigorous and upright grower, hardy and healthy, and bearing young and abundantly, ripening just after Bartlett; described by Rural New Yorker as large, light yellow, marked with bright green mottlings and black dots, and bright blush on sunny side; flesh white, fine-grained, very vinous and sprightly; melting and delicious; very good to best in quality.

Arnold.—Frazier & Arnold of Danville, Indiana, exhibited at the meeting of the Ohio State Horticultural Society a new winter pear called Arnold. It may be described as obtuse pyriform, above medium in size, stem about an inch long, moderately stout, covered, set at an inclination in slight depression, with slight lip; calyx small, closed in rather small basin; color yellow, with a few russet blotches around the stem, and thickly covered with small, brown dots; flesh white, fine-grained, rather sweet, variable in quality, some specimens being of fair quality while others were insipid. It ripens in succession during the winter.

The Dempsey pear heretofore mentioned is now being introduced by Stone & Wellington of Toronto, Ontario.

CHERRIES.

Mercer.—James H. Black, Son & Co. of Highstown, N. J., are offering a new seedling cherry called Mercer, which is said to be vigorous in growth, healthy, and an unfailing and abundant bearer; fruit large size, bright red color and fair quality.

GOOSEBERRIES.

Portage.—A. H. House of Mantina, O., has grown a large, round berry, which is described in the bulletin of the Pomologist of the Department of Agriculture. I have seen it growing on the experiment station grounds here and believe it to be a promising variety.

Carman.—Messrs. Storrs & Harrison of Painesville, O., are propagating a very large and promising new variety called Carman, which is to be offered as a premium to subscribers to the Rural New Yorker for 1893, but it will probably be two or three years before it can be disseminated.

RASPBERRIES.

Eureka.—At the last meeting of the State Horticultural Society a new Ohio berry called Eureka was described by Prof. Green as a very early berry as large as the Gregg. It seems to be called by one or two other names.

Wach.—An Indiana black cap, said to be nearly as large as Gregg, ripening with Souhegan; brush, vigorous, produc, tive and perfectly hardy.

Perfection.—Originated by F. W. Loudon of Wisconsin, said to be a cross between Turner and Cuthbert, being large, elongated, dark crimson, soft and juicy, and rather tart, said to be productive.

STRAWBERRIES.

Greenville.—This new berry which has been favorably described in the reports of the Experiment Station, is now offered for sale by E. M. Buechley of Greenville, O.

Timbrell.—This is a new variety which is very highly praised by the Rural New Yorker.

Princeton Chief.—From Illinois, supposed to be from seed of Crescent, fertilized from Kentucky; blossom perfect, plant vigorous and free from rust; fruit stem tall and very stout; fruit large, very solid, dark, glossy red; best for shipping; commencing to ripen a few days after the Crescent and continuing till July 4th, maintaining its size until the end of the season.

HORACE WILSON.

(With Portrait.)

Horace Wilson, President of the Columbus Horticultural Society for 1891 and 1892, has been a member of the Society, and an active one too, for many years. While not one of the original life members under the reorganization of the affairs of the organization, he may be called one of the *live* members whose presence always adds to the effectiveness of whatever is presented. The writer has often observed how the well directed question will supplement and emphasize any point of a speaker or essayist. Judged by the standard of well placed and pointed horticultural questions, President Wilson is pronounced a skillful hand at legal cross-examination.

He was born in Athens county, Ohio, September 24th, 1823, and is therefore nearly the prescribed three score and ten. His father, Ezekiel Wilson, born in County Antrim, Ireland, was a sea-faring man, and his mother Nancy Camp, came when quite young from Connecticut with her parents, who were early settlers in the region.

The father died when the subject of this sketch was but four years of age, and the mother only four years later, thus throwing the lad upon his own resources at a very early age.

He attended the schools of this region somewhat irregularly and made his way in the world as boys can, until in 1838, when he removed to Licking county. Here he made application for appointment then vacant at West Point, but his successful opponent, W. S. Rosencrans received the coveted prize. Mr. Wilson returned to Athens county in the same year, and in 1840 began his studies in the Ohio University at Athens, supporting himself by teaching and by daily labor during intervals. In 1845, while teaching a private school in Athens he began the study of law under the late John

Welch, and was admitted to the bar at McConnellsville in 1846, subsequently teaching at Nelsonville.

He began practicing his profession at Athens in 1847, continuing at that place till 1859, when he removed to Columbus. In 1847 Mr. Wilson was married to Miss Caroline Hunt of Clinton township, this county.

Although by training and profession a lawyer, his early labors and tastes have led him to take a deep and lasting interest in agriculture and allied sciences; this has been fostered by the care of business interests, including a large farm a few miles from this city upon which much of the summer season is usually spent. The large grounds about his home on Main street testify to the horticultural tastes of the owner. Mr. Wilson has two sons surviving, Clifford and McLee; the former lives in California, the latter is associated with his father and a member of the Society. A son now deceased, Percy R., was at one time Secretary of the Society.

Mr. Wilson has been a Trustee of the Ohio University since 1853; was a member of Columbus Board of Education in 1874–1878. He also served in the City Council from 1861-1865. He was chosen by the Democrats in 1881 to represent the 10th Senatorial District in the Legislature, serving his constituents satisfactorily.

To those of the Society, however, these are minor services; we have known him intimately there. He is now a life member of the Society.

The accompanying portrait of Mr. Wilson is a recent one, and shows him as he appeared while presiding officer.

THE SECRETARY.

T. F. Hunt.